

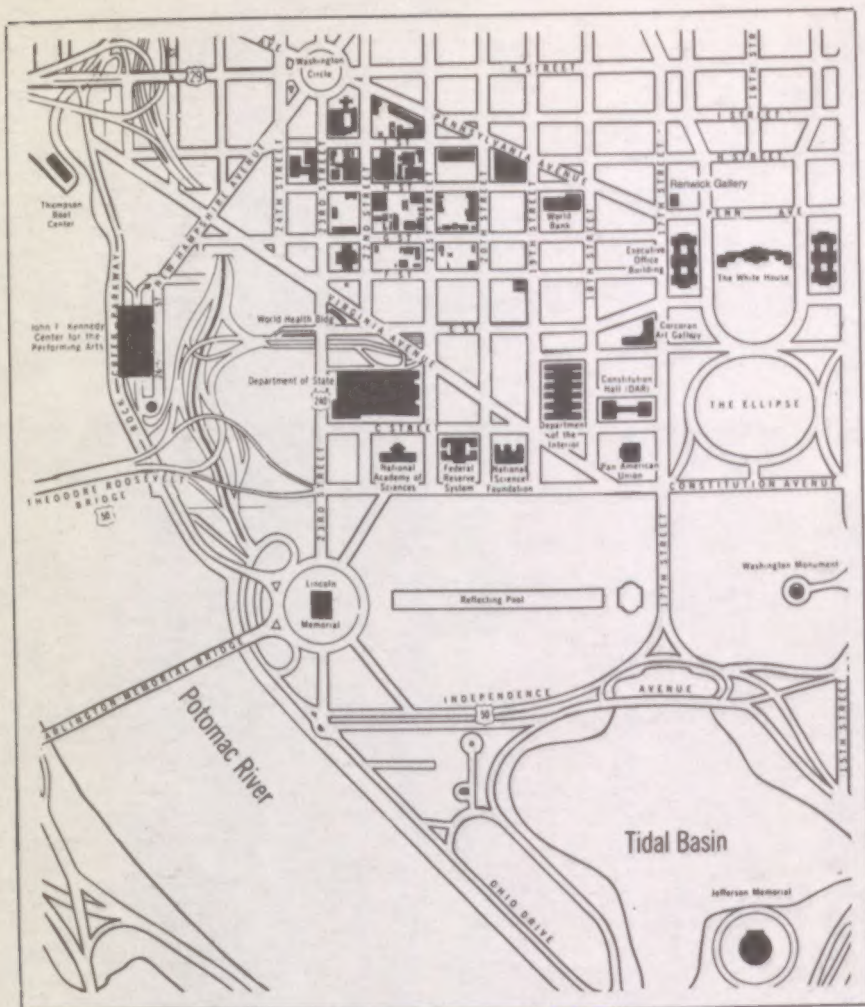


The George  
Washington  
University  
Bulletin

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Undergraduate  
Programs  
1991–1992





THE GEORGE WASHINGTON UNIVERSITY CAMPUS/WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN

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## THE GEORGE WASHINGTON UNIVERSITY BULLETIN

### UNDERGRADUATE PROGRAMS 1991-1992

Columbian College of Arts and Sciences

School of Engineering and Applied Science

School of Education and Human Development

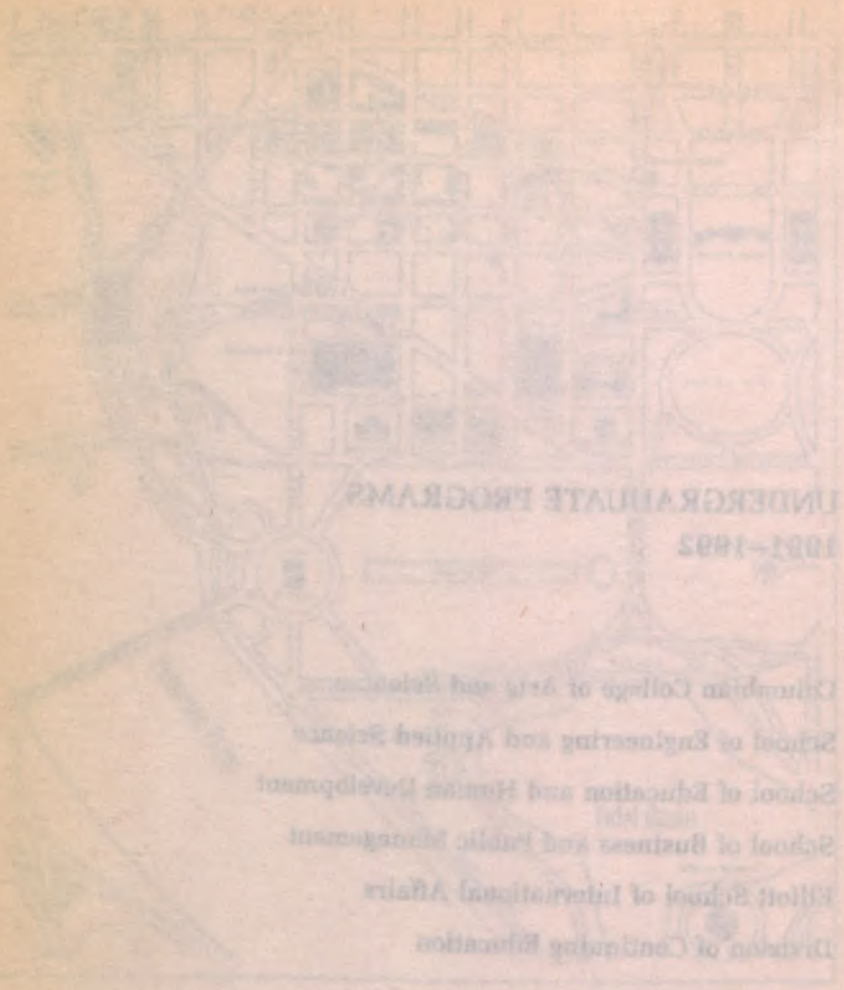
School of Business and Public Management

Elliott School of International Affairs

Division of Continuing Education

Please address correspondence to the office concerned at the George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Graduate Programs, the National Law Center, or the School of Medicine and Health Sciences, please request the appropriate Bulletin.





UNDERGRADUATE PROGRAMS

1991-1992

- Division of Continuing Education
- Elliot School of International Affairs
- School of Business and Public Management
- School of Education and Human Development
- School of Engineering and Applied Sciences
- Columbian College of Arts and Sciences

Information in this Bulletin is generally accurate as of fall 1990. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.



## CONTENTS

5	The Academic Calendar
7	The University
17	Admissions
23	Fees and Financial Regulations
27	Financial Aid
33	Prizes
37	University Regulations
45	Student Services
51	Special Programs
52	Columbian College of Arts and Sciences
66	School of Engineering and Applied Science
77	School of Education and Human Development
86	School of Business and Public Management
95	Elliott School of International Affairs
101	School of Medicine and Health Sciences
102	Division of Continuing Education
105	Summer Sessions
106	Courses of Instruction
108	Accountancy
109	American Studies
111	Anthropology
115	Applied Science
116	Art
124	Biological Sciences
128	Chemistry
131	Civil, Mechanical, and Environmental Engineering
135	Classics
137	Communication
141	Early Modern European Studies
141	East Asian Languages and Literatures
143	East Asian Studies
144	Economics
146	Educational Leadership
147	Electrical Engineering and Computer Science
154	Engineering Management
154	English
160	English as a Foreign Language
161	Environmental Studies
162	Finance
163	Geography and Regional Science
165	Geology
167	Germanic Languages and Literatures
169	History
174	Honors
175	Human Kinetics and Leisure Studies
179	Human Services
180	Humanities
180	International Affairs
182	International Business
183	Journalism
185	Judaic Studies
186	Latin American Studies
187	Liberal Arts
188	Linguistics
188	Management Science



190	Marketing, Logistics, and Operations Management
191	Mathematics
195	Middle Eastern Studies
196	Music
200	Naval Science
202	Operations Research
203	Pharmacology
204	Philosophy
206	Physics
208	Political Communication
209	Political Science
213	Psychology
216	Public Administration
216	Religion
219	Romance Languages and Literatures
225	Service-Learning Program
225	700 Series
226	Slavic Languages and Literatures
227	Sociology
230	Speech and Hearing
231	Statistics/Computer and Information Systems
235	Strategic Management and Public Policy
235	Teacher Preparation and Special Education
237	Theatre and Dance
241	University Professors
243	Urban Planning and Real Estate Development
243	Women's Studies
244	Faculty and Staff of Instruction
287	Index

# CONTENTS

190	Marketing, Logistics, and Operations Management
191	Mathematics
195	Middle Eastern Studies
196	Music
200	Naval Science
202	Operations Research
203	Pharmacology
204	Philosophy
206	Physics
208	Political Communication
209	Political Science
213	Psychology
216	Public Administration
216	Religion
219	Romance Languages and Literatures
225	Service-Learning Program
225	700 Series
226	Slavic Languages and Literatures
227	Sociology
230	Speech and Hearing
231	Statistics/Computer and Information Systems
235	Strategic Management and Public Policy
235	Teacher Preparation and Special Education
237	Theatre and Dance
241	University Professors
243	Urban Planning and Real Estate Development
243	Women's Studies
244	Faculty and Staff of Instruction
287	Index



## THE ACADEMIC CALENDAR 1991-1992

<b>August 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>December 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>April 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
<b>September 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>January 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>May 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
<b>October 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>February 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	<b>June 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
<b>November 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>March 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>July 1992</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

### 1991 Fall Semester

August 22-23	Advising and testing begin for entering students
August 26	Classes begin
Aug. 26-Sept. 6	Late registration*
September 2	Labor Day (holiday)
September 6	Fall Convocation
October 1	Applications due for February graduation
October 14	Columbus Day (holiday)
November 1	Applications due for spring semester financial aid
November 4	Registration for spring semester classes begins*
November 28-29	Thanksgiving holiday
December 9	Last day of fall semester classes
December 10-11	Reading period
December 12-20	Examination period

\* Registration is by telephone only; consult the *Schedule of Classes*.



**1992 Spring Semester**

January 10	Advising and testing for entering students
January 13	Classes begin
January 13-23	Late registration*
January 20	Martin Luther King Day (holiday)
February 1	Applications due for May graduation Deadline for submission of 1992-93 financial aid applications for entering undergraduate students
February 16	Winter Convocation
February 17	George Washington's birthday observed (holiday)
March 1	Deadline for submission of 1992-93 financial aid applications for continuing undergraduate students
March 16-20	Spring recess
March 27	Honors Convocation
April 1	Deadline for submission of summer sessions financial aid applications
April 6	Registration for fall semester classes begins*
April 27	Last day of spring semester classes
April 28-29	Reading period
April 30-May 8	Examination period
May 10	Commencement

\* Registration is by telephone only; consult the *Schedule of Classes*.



## THE UNIVERSITY

### History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half-century, the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

### Purpose and Objectives

The purpose of The George Washington University was to realize "the aspirations of Washington, Jefferson and Madison, for the erection of a university at the seat of the Federal Government." Over the years it has been the aim to develop the



University ideal in the nation's capital with a view toward meeting the changing needs of society while continuing to pursue the traditional principles of learning and research.

The George Washington University is dedicated as an institution of higher learning to promote the general advancement of human knowledge and understanding and the development of every student to his or her highest potential so that each may make the maximum contribution to the improvement of the standards, mores, and scientific and cultural climate of all peoples.

In pursuit of excellence in education, the University dedicates itself to freedom of inquiry, respect for truth, and support for research. The University is committed to preserving a curriculum that embodies the content and spirit of the liberal arts and promotes academic specialization and professional education; fostering respect and communication among different cultures; and maintaining a continuing process of institutional self-assessment and adaptation to meet the rapidly changing needs of society.

The University recognizes its special opportunities in and obligations to one of the principal capitals of the world. It is a primary objective of the University to utilize its location in the nation's capital in continuing the development of a great nationally and internationally oriented university.

### **University Policy on Equal Opportunity**

George Washington University does not discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, or veteran status. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### **The College, Schools, and Division**

George Washington University includes nine academic units, as follows:

*Columbian College of Arts and Sciences*\* offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music.

*The Graduate School of Arts and Sciences*† offers advanced study and research leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science in Forensic Science, and Doctor of Philosophy.

*The School of Medicine and Health Sciences* offers work leading to the degrees of Associate in Science, Bachelor of Science, Bachelor of Science in Health Science, Master of Public Health, and Doctor of Medicine.

*The National Law Center*‡ offers courses leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.

\* Columbian College of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

† The Graduate School of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering programs leading to the joint degrees of Master of Science-Doctor of Medicine and Doctor of Medicine-Doctor of Philosophy.

‡ The National Law Center cooperates with the Elliott School of International Affairs, the Graduate School of Arts and Sciences, and the School of Business and Public Management in offering programs leading to joint Juris Doctor and master's degrees.



The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Human Development and Bachelor of Science in Human Kinetics and Leisure Studies and graduate studies leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Association Management, Master of Business Administration, Master of Health Services Administration, Master of Public Administration, Master of Science in Information Systems Technology, Master of Taxation, Master of Urban and Regional Planning, Specialist in Health Services Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts.

The Division of Continuing Education assists in providing continuing education programs for adult students by administering or coordinating the off-campus credit offerings of the colleges and schools of the University, at both the undergraduate and graduate levels. Noncredit courses are also offered through the Division.

### **Academic Status**

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Master of Public Health program has full accreditation from the Council on Education for Public Health. All undergraduate engineering curricula, including the computer engineering option, of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible bachelor's, master's, and doctoral degree programs; the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs; the master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management has maintained full membership in the Middle Atlantic Association of Colleges of Business



Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Master of Urban and Regional Planning degree program is recognized by the American Planning Association. The Master of Association Management degree program is recognized by the American Society of Association Executives. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech-language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech-Language Pathology and Audiology.

### **Location**

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions.

A new campus in Northern Virginia for graduate studies, research projects, and professional development programs is planned to begin operations in fall 1991. The campus is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

### **Consortium of Universities of the Washington Metropolitan Area**

George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities; Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation, except for LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.



### **The University Libraries**

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the libraries of the National Law Center and the School of Medicine and Health Sciences.

These collections contain more than 1,600,000 volumes. Endowments supplementing the University appropriation provide research materials in the social sciences, the humanities, engineering, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained at library service desks. Individual and class instruction in the use of the library and orientation to library facilities are given by librarians upon request.

The library strives to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, the reference staff identifies and locates desired research materials not easily found through more traditional methods. The staff assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Graduate degree candidates at George Washington University may, upon application, be issued a Consortium library card that permits direct borrowing from the main campus libraries of most other academic institutions in the Washington area. Graduate students may also obtain books and journal articles on inter-library loan from other libraries in the city, throughout the United States, and in various other countries.

ALADIN, the computerized catalog of library materials, lists the holdings of the Gelman Library and the libraries of seven other universities in the Washington area. The catalog can be accessed from terminals in the libraries or from personal computers on campus or elsewhere.

### **GW Television**

The main television resource of the University is GWTV, a state-of-the-art ITFS, multichannel broadcast facility. GWTV develops courses and programs in cooperation with academic departments for broadcast off campus; produces videotapes for class use and for continuing professional education; helps expand a program of national and international teleconferences; and manages the acquisition and maintenance of television equipment and facilities in various instructional units.

GWTV has the capability to receive from and transmit to any communications satellite. Video teleconference programs are delivered to a number of on-campus locations, where participants can interact by telephone link with the originating site.

### **Office of Alumni Relations**

The Office of Alumni Relations, in conjunction with the General Alumni Association, makes available to alumni and their families a program of services and educational and cultural events. Alumni are encouraged to inquire about available services and programs at the Office of Alumni Relations and to keep the Office informed of any changes in address or occupation.

### **General Alumni Association**

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.



Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of Continuing Education students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of CCEW certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.

### **The Board of Trustees of the University**

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Alumni trustees are indicated by an asterisk.

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 Linda Donnels, M.A., Acting Dean of Students  
 E. Donald Driver, M.B.A., Director of the International Services Office  
 Valerie L. Epps, M.S., Director of the Multicultural Student Services Center  
 J. Matthew Gaglione, B.S., University Registrar  
 Ronald W. Howard, B.A., Director of the Alumni Admissions Program  
 Jill Felice Kasle, M.S., J.D., University Marshal  
 Isabel Kuperschmit, M.D., Director of the Student Health Service  
 Anthony T.G. Pallett, M.A., Executive Director of Enrollment Management



Michael N. Peller, *Director of the Smith Center*

J. Bradley Reese, Ph.D., *Director of the Computer and Information Resource Center*

Geri Rypkema, M.A. in Ed.&H.D., *Director of the Office of Fellowships and Graduate Student Support*

Donna Scarboro, Ph.D., *Director of Summer Sessions*

Robert DeHaven Shoup, B.B.A., *Director of the Budget*

Kathy Sims, M.S., *Executive Director of the Career and Cooperative Education Center*

George William Gustav Stoner, M.A., *Director of Undergraduate Admissions*

Susan Strasser, Ph.D., *Director of the University Honors Program*

LeNorman J. Strong, M.S., *Director of the Office of Campus Life*

Ann Elisabeth Webster, M.A., *Director of Housing and Residence Life*

Thomas D. White, M.P.A., *Executive Director of Alumni Programs*

### **The College, Schools, and Division**

Robert Wayne Kenny, Ph.D., *Dean of Columbian College of Arts and Sciences and Acting Dean of the Graduate School of Arts and Sciences*

Robert I. Keimowitz, M.D., *Dean of the Medical Center, for Academic Affairs*

John C. LaRosa, M.D., *Dean of the Medical Center, for Research*

Jack Harlan Friedenthal, J.D., *Dean of the National Law Center*

Donald Gross, Ph.D., *Acting Dean of the School of Engineering and Applied Science*

Leo D. Leonard, Ed.D., *Dean of the School of Education and Human Development*

Ben Burdetsky, Ph.D., *Dean of the School of Business and Public Management*

Maurice Alden East, Ph.D., *Dean of the Elliott School of International Affairs*

Abbie O. Smith, Ed.D., *Acting Dean of the Division of Continuing Education*

Christopher James Deering, Ph.D., *Associate Dean of Columbian College of Arts and Sciences*

Norayr Krikor Khatcheressian, Ph.D., *Associate Dean of Columbian College of Arts and Sciences, for Administrative Services*

David Willard McAleavey, Ph.D., *Associate Dean of Columbian College of Arts and Sciences, for Student Services*

Edward Alan Caress, Ph.D., *Associate Dean of the Graduate School of Arts and Sciences*

Thomas Eugene Piemme, M.D., *Associate Dean of the Medical Center, for Continuing Medical Education*

Winfield Harker Scott, Ph.D., *Associate Dean of the Medical Center, for Education; Director of Education*

Teresa Moran Schwartz, J.D., *Associate Dean of the National Law Center, for Academic Affairs*

John Smith Jenkins, J.D., M.A., *Associate Dean of the National Law Center, for Administrative Affairs*

James Elmer Feir, Ph.D., *Associate Dean of the School of Engineering and Applied Science*

Jay R. Shotel, Ed.D., *Associate Dean of the School of Education and Human Development*

Michael Mont Harmon, Ph.D., *Senior Associate Dean of the School of Business and Public Management*

Henry Nau, Ph.D., *Associate Dean of the Elliott School of International Affairs*

Robert Frederick Dyer, D.B.A., *Associate Dean of the School of Business and Public Management, for Graduate Business Programs*



- Lois Graff, M.B.A., Ph.D., Associate Dean of the School of Business and Public Management, for Undergraduate Programs
- Avery DeLano Andrews, Ph.D., Assistant Dean of the Graduate School of Arts and Sciences
- Charles Edward Rice, Ph.D., Assistant Dean of the Graduate School of Arts and Sciences
- David Alton Rowley, Ph.D., Assistant Dean of the Graduate School of Arts and Sciences
- Benjamin Cael Blatt, M.A., M.D., Assistant Dean of the Medical Center, for Student Affairs
- John Franklin Williams, Jr., M.S., M.P.H., M.D., Assistant Dean of the Medical Center, for Admissions
- Jarrett Michael Wise, B.S., Assistant Dean in the School of Medicine and Health Sciences
- Alfreda Robinson, M.A., J.D., Assistant Dean of the National Law Center, for Student Affairs
- Nancy L. Schultz, J.D., Assistant Dean of the National Law Center; Director of Legal Research and Writing
- Robert V. Stanek, J.D., Assistant Dean of the National Law Center; Director of Admissions and Financial Aid
- Marlana R. Valdez, J.D., Assistant Dean of the National Law Center, for Graduate Programs
- Janet Craig Heddesheimer, Ph.D., Assistant Dean of the School of Education and Human Development
- Billie Jo Moreland, Ed.D., Assistant Dean of the Division of Continuing Education
- Gregory M. Logan, M.A. in Ed.&H.D., Assistant Dean of the Division of Continuing Education

### The Faculty Senate 1990-91

- |                           |                             |
|---------------------------|-----------------------------|
| Barry Louis Berman        | Arthur David Kirsch         |
| *Ben Burdetsky            | *Leo D. Leonard             |
| Salvatore Frank Divita    | Dorothy Adele Moore         |
| *Maurice Alden East       | Robert Eugene Park          |
| *Roderick Stuart French   | William Carleton Parke      |
| *Jack Harlan Friedenthal  | Alvin Edward Parrish        |
| *John Matthew Gaglione    | Philip Robbins              |
| Charles Alexander Garriss | Lilien Filipovitch Robinson |
| Joseph M. Giordano        | Robert Warren Rycroft       |
| *William Byron Griffith   | Stefan Otto Schiff          |
| *Donald Gross             | John Andrew Spanogle        |
| Murli Manohar Gupta       | Susan J. Tolchin            |
| Robert Joseph Harrington  | *Stephen Joel Trachtenberg  |
| Dennis Howard Holmes      | Roger Hans Trangsrud        |
| Donna Lind Infeld         | Clemmont Eyvind Vontress    |
| Walter Kurt Kahn          | Glenn Anthony Walker        |
| *Robert I. Keimowitz      | Anthony Marvin Yezer        |
| *Robert Wayne Kenny       | John Edmund Ziolkowski      |

Ralph Gustav Steinhardt, Parliamentarian



\* Ex officio member

† Chairman of the Executive Committee



## ADMISSIONS

The University is coeducational and accepts applications for admission each semester and summer session.

An application for admission to degree candidacy should be accompanied by a \$45 application fee. The fee must be paid by check or postal money order, payable to The George Washington University. The application fee is waived for students applying for readmission who were registered as degree candidates at the time of their last registration at this University and who have not since registered at another institution.

Applicants are urged to submit the application form and complete credentials well in advance of the semester or summer session for which they seek admission. Specific dates are given in each section below.

Acceptance is based on available space and evidence of potential for successful study. The following criteria are considered: degree or major objective related to rigor of program and grades achieved in secondary school or previous college, standardized test scores, relationship between grades and test scores, and recommendations.

The University reserves the right to refuse admission to any student with an academic record that indicates doubtful ability to succeed in college. In the evaluation process, there is no discrimination on the basis of race, color, religion, sex, national origin, age, handicap, or veteran status.

### Admission Procedure

Application forms for admission or readmission to undergraduate or nondegree status are available from and should be returned to the Office of Admissions, George Washington University, Washington, D.C. 20052. For detailed admission requirements, see the appropriate college or school in this *Bulletin*.

### Secondary School Students

#### Freshmen—Regular Decision

Applicants who wish to begin college in a summer session or in the fall semester should apply during the fall term of the senior year in high school. Preference for places in the entering class will be given to students who submit applications and required credentials prior to February 1. Students graduating at midyear who wish to begin college in the spring semester should apply no later than November 1.

Applicants from secondary schools must arrange to have sent directly from their schools to the Office of Admissions a complete academic record together with a teacher and a counselor recommendation. This information should be supplied on the appropriate forms in the application packet.

**Entrance Examinations**—Applicants from secondary schools must submit scores on the College Board Scholastic Aptitude Test (SAT) or on the American College Testing (ACT) battery. Submission of scores on College Board Achievement Tests in English composition and mathematics is recommended. Score reports must be sent directly to the Office of Admissions from the testing agency.

#### Freshmen—Early Decision

High school seniors applying for fall admission as full-time freshmen with George Washington University as their first choice may wish to take advantage of the Early Decision Program. The three-year secondary school record must be of high quality. To apply for Early Decision, submit the application for admission

and supporting credentials by November 15; you will receive notification of our decision by December 15. If accepted, you are required to send in your declaration of intent to attend GW, together with appropriate deposits, no later than January 15 and to withdraw all applications for admission to other colleges and universities. Applicants not accepted for Early Decision will receive full consideration for regular fall admission after review of seventh-term grades.

### **Freshmen—Early Admission Plan**

Exceptionally well-prepared students who have completed the junior year in high school may apply for early admission. This plan is designed for students with the emotional maturity, as well as the academic ability and background, necessary for college entrance. In most cases, applicants accepted for early admission have exhausted academic offerings in secondary school to the extent that remaining for the senior year is not in the best interests of the students or their schools.

To be considered for early admission, students must

1. demonstrate superior academic performance through the junior year of high school;
2. meet the entrance requirements of the college or division applied to, by completing all required entrance units with the possible exception of the fourth year of English;
3. have the unqualified recommendation of the secondary school principal or counselor;
4. submit two letters of recommendation (in addition to the counselor's) from teachers who can testify to the student's maturity and general readiness to enter college;
5. submit a letter from a parent or guardian supporting early college entrance;
6. arrange to have SAT or ACT scores sent directly to the Office of Admissions by the testing agency;
7. take the College Board Achievement Tests in English composition and mathematics and one other Achievement Test (of the student's choice) and arrange to have the scores sent directly to the Office of Admissions by the testing agency.

### **Transfer Students**

Undergraduate students from other institutions should submit applications and required credentials prior to June 1 for the fall semester, November 1 for the spring semester, and April 1 for the summer sessions.

To be accepted for transfer, a student must be in good standing as to scholarship and conduct at all postsecondary institutions previously attended. A student who has been academically dismissed will not normally be considered for admission.

An applicant who has attended one or more institutions of higher education must request each registrar to mail directly to the Office of Admissions a transcript of his or her record, even if credits were not earned.

In addition, an applicant must have his or her high school record and College Board or ACT test scores sent to the Office of Admissions directly from the high school and testing agency.

### **Advance Tuition Deposit**

After notification of acceptance, a \$300 advance tuition deposit will be required of all full-time undergraduate students, including those readmitted. This deposit is due May 1 for students entering in the fall semester and December 15 for students entering in the spring semester. The deposit is credited toward tuition and is not refundable.



## Advanced Standing and Advanced Placement

### *Credit From Other Institutions of Higher Learning*

Where there is no duplication involved, either through course work or examination, credit may be granted for work successfully completed at other institutions of higher learning. Assignment of transfer credit will depend on the appropriateness of the courses completed elsewhere, the standing of the institution at which the previous work was completed, and the regulations of the division of this University in which the credit is to be applied toward a degree. Transfer credit must satisfy the requirements for the degree sought as stated in this *Bulletin*. Credit may be accepted provisionally or may require validation by examination or completion of higher-level courses in the same sequence. Transfer credit will not be assigned for courses completed with a low-pass grade (D or the equivalent); course work completed in vocational/technical programs (e.g., secretarial studies); or sub-freshman-level remedial work.

In Columbian College, credit assigned for professional courses (those in engineering, education, or business) is limited to 9 credit hours. In the School of Business and Public Management, there is a limitation of three credit hours per course to be assigned for work completed at another institution; students transferring to that school from two-year colleges will receive no more than 60 credit hours to be applied to degree programs at this University. Columbian College of Arts and Sciences and the Elliott School of International Affairs accept a maximum of 66 credit hours from two-year colleges. The School of Education and Human Development will accept no more than 63 credit hours. All transfer students must satisfy the residence and course requirements for degrees sought at this University.

### *Credit by Examination, from Service Schools, from Noncollegiate Organizations, and by Nontraditional Methods*

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following except as noted below.

**College Board Advanced Placement (AP) Tests**—On the basis of a score report sent to the Office of Admissions from the Educational Testing Service at the student's request, undergraduate credit is assigned for scores of four or five on all Advanced Placement Tests except the test in Studio Art, for which no credit is awarded. Test scores below four are not accepted for assignment of academic credit. The Advanced Placement Tests are administered in the secondary schools in May of each year. Normally only students who complete a course designated as Advanced Placement are prepared for the examination. Arrangements for the examination are the responsibility of the applicant and should be made through the secondary school attended or with the Program Director, College Board, Advanced Placement Tests, CN 6671, Princeton, N.J. 08541-6671.

**College Board College-Level Examination Program (CLEP)**—CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: English composition, humanities, mathematics, natural sciences, and social sciences and history. CLEP Subject Examinations measure achievement in specific college-level courses and are offered in 30 subjects.

Credit is assigned for the General Examinations, with the exception of the English composition examination, passed at approximately the 50th percentile or above. In the School of Business and Public Management, credit is not assigned for the mathematics examination. In the School of Engineering and Applied Science, credit is not assigned for the mathematics or natural sciences examinations.

Credit is assigned, with some exceptions, for the Subject Examinations passed at the level recommended in the College Board model policy. A student registered in a degree program at this University must seek departmental and dean's approval prior to taking a CLEP Subject Examination for credit to be applied toward the degree. Credit may not be earned by passing the examination after having taken an equivalent course. Arrangements for the examinations are the responsibility of the student and should be made with the College Board College-Level Examination Program, CN 6601, Princeton, N.J. 08541-6601. See the School of Business and Public Management for specific restrictions on CLEP credit for applicants to that school.

**Special Departmental Examinations for Undergraduates**—Credit may be assigned for Special Departmental Examinations administered by Columbian College departments to students enrolled in all undergraduate divisions of the University.

**Credit Earned Through USAFI and DANTES**—Except to students enrolled in the School of Business and Public Management, credit is assigned for approved United States Armed Forces Institute (USAFI) and Defense Activity for Nontraditional Education Support (DANTES) courses.

**Credit from Service Schools**—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected service school courses. Students seeking such credit should consult the Office of Admissions.

**Credit for Courses Offered Through Correspondence and Television**—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected courses taught by nontraditional methods, provided that such courses require the student's physical presence during a monitored final examination. Assignment of such credit will require a statement from the sponsoring agency that such an examination was a required part of the course.

#### **Advanced Placement or Waiver by Examination**

Advanced placement or waiver of a requirement will be granted on the basis of scores on Achievement Tests of the College Board as follows:

Achievement Test	Minimum Score	Exemption
English Composition	650	Waives Engl 10
European and/or American History	600	Waives Hist 39-40 and/or 71-72
French, Spanish	650	Waives a two-year language requirement
German, Hebrew, Latin	600	
Russian	700	

A score of 58 or above on the SAT Test of Standard Written English, or a score of 28 or above on the ACT English Usage Test, will waive English 10.

Advanced standing (academic credit) is not assigned on the basis of SAT, ACT, or Achievement Test results.

#### **Division of Continuing Education**

The Office of University Students in the Division of Continuing Education makes on-campus credit courses available to nondegree students. Application forms for admission to nondegree status in this Division are available from and should be returned to the Office of Admissions. There is no fee for applying to this Division. For detailed entrance requirements, see Office of University Students under Division of Continuing Education in this Bulletin.



Students in this Division may not take graduate courses in accountancy, business administration, or management science; registration in other courses may be denied students in nondegree status when space is needed for degree students.

A maximum of 45 credit hours earned in the Division of Continuing Education may be applied toward a bachelor's degree in the undergraduate degree-granting schools of the University.

### **Readmission**

Previously registered students who wish to resume studies on campus after discontinuing enrollment for one or more semesters (summer sessions excluded) must apply for readmission. Deadlines for readmission applications from students in good academic standing are the same as those for new applications. Students who discontinued enrollment while on academic probation or under suspension should allow at least one month for appropriate processing of readmission credentials. Students seeking readmission after having attended other institutions of higher education in the interim must have complete official transcripts sent to the appropriate office at this University from all other institutions attended. Students seeking readmission as degree candidates after previous enrollment in nondegree status must submit a standard undergraduate degree application and fee, together with all entrance credentials not previously received or required.

Applicants for readmission are subject to the University regulations in effect at the time of readmission.

The application fee is waived for students applying for readmission after previous enrollment as degree candidates at this University if they have not since registered as degree candidates at another institution.

### **Students From Foreign Institutions**

Applications, required records, and scores on the Test of English as a Foreign Language (see below) should be received from international students no later than February 1 for the fall semester and October 1 for the spring semester. For detailed admission requirements, see the appropriate college or school in this Bulletin.

### **Required Records**

At the time the application is sent, students must have the educational institutions previously attended send directly to the GW Office of Admissions copies of official certificates and records listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from all secondary schools, colleges, and universities attended are required. Records of state examinations and certificates are also required. These records become the property of the University and cannot be returned.

These documents should be in the language in which the institution keeps its official records. If they are in a language other than English, the copies sent should be accompanied by a certified English translation.

### **Language Tests**

All applicants from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL), and the University looks for a minimum score of 550 in considering candidates for admission. (The School of Business and Public Management requires a minimum score of 600 on a second taking of the TOEFL.) Applicants are responsible for making arrangements to take the test by addressing inquiries to TOEFL, CN

6151, Princeton, N.J. 08541-6151. The completed registration form must be returned well in advance of the semester for which admission is sought. On the application for the TOEFL, students should specify that the scores are to be sent to the appropriate admissions office at this University. Registration for the TOEFL does not constitute application for admission to George Washington University.

Admitted students from countries where English is not an official language are also required to take an English as a Foreign Language placement test prior to registering at the University; the placement test is waived for students with a TOEFL score of at least 600 and a Test of Written English score of at least 5. Depending on the results of this test, the student's academic program may be restricted in number and type of courses that can be taken. Students who are required to take English as a Foreign Language courses at an intensive level might not be able to take other courses during that semester. College credit is not granted for English study below the level of standard freshman English courses.

#### **Financial Certificate**

A Financial Certificate must be completed and submitted with the application for admission of all international students planning to study at the University under the authorization of either a student (F) or exchange visitor (J) visa. Satisfactory completion and submission of the Financial Certificate is required for the issuance of a Form I-20 or IAP-66.



## FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the 1991 summer sessions and the academic year 1991-92.

### Tuition Fees

For full-time undergraduate study\* in Columbian College of Arts and Sciences, the School of Education and Human Development, the School of Business and Public Management, and the Elliott School of International Affairs:

Students entering a degree program in academic year 1991-92 . . .	\$14,600
Students who entered a degree program in academic year 1990-91	14,600
Students who entered a degree program in academic year 1989-90	13,600
Students who entered a degree program before summer 1989 . . . . .	12,600

For full-time undergraduate study\* in the School of Engineering and Applied Science:

Students entering a degree program in academic year 1991-92 . . .	14,600
Students who entered a degree program in academic year 1990-91	14,600
Students who entered a degree program before summer 1990 . . . . .	13,600

Other categories of undergraduate study:

All part-time students, per credit hour . . . . .	490
All nondegree students, per credit hour . . . . .	490
Summer sessions, all students, per credit hour . . . . .	403

**Registration Fee** (nonrefundable; charged all students per semester and summer registered):

Registration prior to the beginning of the semester . . . . .	25
Registration during the first week of the semester . . . . .	75
Registration after the first week of the semester . . . . .	125

**Marvin Center Fee** (charged all students registered on campus)—\$12.60 per credit hour, to a maximum of \$126 per semester

**Additional Course Fees**—In certain courses additional fees, such as laboratory and material fees, are charged by semester as indicated in the course descriptions. If breakage of apparatus is in excess of the normal amount provided for in the laboratory fee, the student will be required to pay such additional charges as are determined by the department concerned.

**Computer Usage Fees** (charged for courses that use the computer facilities of the University)—Applicable fees are listed in the *Schedule of Classes* for each semester. The maximum computer usage fee is \$100 for any semester.

**Residence Hall and Food Service Fees** (see page 45)

\*A full-time program is defined as 12-17 credit hours per semester; a part-time program is fewer than 12 credit hours per semester. Undergraduates taking more than 17 credit hours per semester will be charged at the rate of 1 credit hour (\$490) for each credit exceeding that limit. In the event that a student's program requires more than 17 hours per semester, there will not be an additional charge for the 18th hour. For purposes of financial classification, students who enter a degree program in the summer preceding an academic year are considered to have entered that academic year (For example, a student who begins course work toward a degree in summer 1991 is an entering student in academic year 1991-92.)

**Special Fees and Deposits**

Application fee (all degree candidates), nonrefundable .....	\$45
Advance tuition deposit, nonrefundable, charged each entering or re-admitted full-time undergraduate student .....	300
Housing deposit, nonrefundable, charged each applicant for residence hall space .....	300
Orientation fee .....	125
Graduation fee (charged all students applying for graduation) .....	78
Late-payment fee (see Payment of Fees, below) .....	50
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason .....	15
Special Columbian College of Arts and Sciences departmental examination to qualify for receiving credit (advanced standing), waiver of requirement, or both .....	100
Waiver examination to qualify for advanced placement .....	25
English test for international students (when required) .....	20
Laboratory check-out fee, for failure to check out of chemistry laboratory by the deadline date set by the instructor (a student who drops a chemistry course before the end of the semester must check out of the laboratory at the next laboratory period) .....	10
Statement issued by the Department of Romance Languages and Literatures certifying the degree of oral and/or written fluency and command of the French, Italian, Portuguese, or Spanish languages ....	50
Transcript fee .....	3
Replacement of lost or stolen picture identification card .....	25

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the use of the University library; (2) the services of the Career and Cooperative Education Center; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified. These privileges terminate when the student withdraws or is dismissed from the University.

**Payment of Fees**

When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 credit hours or more may use a deferred payment plan at the time of each registration, which permits payment of one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the first day of the semester to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to use deferred payment unless the total tuition and fee charges exceed the value of the tuition awards by \$2,600 or more. Under such circumstances the student may be



permitted to pay one-half of the amount due at the time of registration and to defer the balance.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

**GW Monthly Payment Plan**—The University's Monthly Payment Plan is available to all students. Upon receipt of the appropriate application, the University will establish an account and mail payment coupons and envelopes for use to ensure proper credit of payments. The plan covers an academic year (excluding summer sessions) and requires ten monthly payments, May through February. Payments must be received by the 10th of each month. If a decision is made after May to use this plan, all missed payments must be made to bring the account current to the time participation is initiated. There is no charge and no interest for using the plan if all payments are made as scheduled.

**Commercial Prepaid and Deferred Payment Plans**—Several commercial programs for parents who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

Mellon Bank Edu-Check Plan, P.O. Box 8888, Wilmington, Del. 19899  
Knight Insured Tuition Payment Plan, 855 Boylston Street, Boston, Mass. 02116  
School-Chex, Irving Trust Company, 61 Broadway, New York, N.Y. 10007  
Educational Loan Program, The Riggs National Bank, 1120 Vermont Ave., N.W., Washington, D.C. 20005  
The Tuition Plan, Inc., 57 Regional Drive, Concord, N.H. 03301

### Off-Campus Courses

Fees for each semester are due and payable in full at the time of each registration; however, a student registering for a credit course lasting 13 weeks or longer may use deferred payment at each registration to make payments in two equal installments—one-half at the time of registration and one-half by the eighth week of the semester. Payments are due at the stipulated times. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the beginning of each semester to the date payment is made.

Students receiving partial government tuition assistance, employee benefits, and partial scholarships must pay their portion of the tuition in full at the time of registration.

Except for specified special sessions, tuition and fees for credit courses lasting less than 13 weeks and for all noncredit courses are payable in full at registration.

### Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the college, school, or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing. No refund of the tuition deposit required of entering students is granted.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. **Complete withdrawal from all courses (on-campus students):**

Withdrawal dated on or before the end of the first week of the semester . . . .	80%
Withdrawal dated on or before the end of the second week of the semester . .	60%
Withdrawal dated on or before the end of the third week of the semester . . .	40%
Withdrawal dated on or before the end of the fourth week of the semester . .	25%
Withdrawal dated after the fourth week of the semester . . . . .	None
2. **Partial withdrawal:** If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
4. **Summer Sessions:** In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days following the scheduled registration day. No refund will be made for courses dropped thereafter.
5. **Refund schedule for off-campus registration:**

After the first class meeting but before the third class meeting . . . . .	80%
After the third class meeting but before the fifth class meeting . . . . .	50%
After the fifth class meeting . . . . .	None

No refund will be made for sessions of less than 21 days.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Please note that effective January 1993, the University will initiate a student health fee of \$100.



## FINANCIAL AID

George Washington University offers a program of financial assistance for undergraduate and graduate students. Undergraduate aid consists of two basic types: awards for academic achievement without reference to financial circumstances (honor scholarships) and scholarships, grants, loans, and employment based on academic achievement and demonstrated financial need. All undergraduate gift aid (institutional scholarships and grants and federal grants) requires that the student be working on the first undergraduate degree. Undergraduate gift aid requires that the recipient be registered for a full-time course load at GW. Loans and resident assistantships not based on financial need are available. In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade point average for particular awards and are not financially encumbered by any other University office. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

### Merit Aid

*Presidential Honor Scholarships*—Incoming freshmen with superior academic credentials may be eligible for one of GW's Presidential Honor Scholarships, which are based entirely on academic excellence without regard to financial need. Full- and half-tuition scholarships, respectively, are awarded to Finalists and Semifinalists in the National Merit Scholarships program, the National Hispanic Scholar Awards Program, the National Achievement Scholarship Program for Outstanding Negro Students, and other such national academic competitions. Partial-tuition scholarships are also available to other outstanding applicants. Renewal is dependent on annual reapplication by March 1 and satisfactory academic progress (a B – average for at least 15 credit hours per semester, **exclusive of courses not counted toward graduation**).

*Honor Scholarships*—Board of Trustees honor scholarships of up to half-tuition for the academic year, based entirely upon academic achievement and potential without regard to financial need, may be renewed for continuing students who received them as freshmen, provided that a grade average of B or better is maintained in 15 credit hours per semester.

*Engineering Honor and High Honor Scholarships*—These programs recognize academically talented students who wish to study at the School of Engineering and Applied Science. The scholarships are based entirely on academic excellence without regard to financial need. They are available to transfer students who meet the criteria given below and are U.S. citizens or permanent residents.

The Evelyn Elder and Lloyd Hartman Elliott Engineering Honor Scholarships (EHS) cover up to one-half the tuition cost of attending SEAS. Engineering High Honor Scholarships (EHHS) cover full tuition. Both may be renewed through completion of the undergraduate degree, provided the recipient is enrolled full time in an engineering curriculum and scholarship criteria are met, with the option of an additional year if the student wishes to pursue graduate study at the master's level. A minimum grade-point average of 3.0 in 15 or more credit hours per semester is needed to retain the EHS, and a minimum grade-point average of 3.3 in 15 or more credit hours per semester is needed to retain the EHHS. A student must reapply for the EHS or EHHS by March 1 each year.

For both the EHS and EHHS, the student must have completed (or be completing by the end of the present semester) 30 credit hours at an accredited college or

university, including at least 6 credit hours of college calculus or higher mathematics and at least 3 credit hours of college-level physics or chemistry. For the EHS, the student must have achieved an overall grade average of at least 85% (3.4) and a combined average of 80% (3.2) in college-level mathematics and science courses. For the EHHS, the student must have achieved an overall grade average of at least 90% (3.6) and a combined average of 85% (3.4) in college-level mathematics and science courses.

#### **Need-Based Aid**

The University offers extensive programs of scholarships, grants, loans, and employment based upon demonstrated need. The University participates in the Perkins Loan, Pell Grant, Supplemental Educational Opportunity Grant, and the College Work-Study programs.

Applications and supporting credentials for financial aid must be filed by February 1 (incoming freshmen) and March 1 (transfers and continuing undergraduates) preceding the academic year of the award for the fall semester; and, if funds are available, by November 1 for the spring semester and by April 1 for the summer sessions. Only students who are enrolled in this University for at least 6 credit hours in the immediately preceding spring semester or who have applied for financial aid for the following fall semester are eligible for consideration for summer sessions financial aid. A student must reapply for all financial aid, including scholarships, each year; renewal is contingent upon funds being available when the student completes the application.

Complete information concerning financial assistance is contained in the student financial aid pamphlet, available at the Office of Student Financial Assistance.

#### **The George Washington University Scholarships**

Full- and partial-tuition scholarships begin in the fall semester and may be renewed through the senior year, provided the holder reapplies by the published deadlines, maintains a *B* average or better, and continues to be in financial need.

#### **Other Scholarships**

Achievement Rewards for College Scientists Foundation Scholarship  
 Sherman Page Allen Memorial Scholarship Fund  
 Alumni Scholarships  
 American Association of Cost Engineers Scholarship  
 Mary J. Anderson Scholarship  
 D.F. and J.D. Antonelli Scholarship Fund  
 Athletic Scholarship Fund  
 Atlantic Research Corporation Scholarship  
 Byron Andrews Scholarship  
 Sigrid Weeks Benson Scholarship  
 Henry N. Brawner, Jr., Foundation Scholarship Fund  
 A.D. Britt Scholarship Fund  
 Frederick Albert and Alma Hand Britten Scholarships  
 Mary Ellen Caplin Scholarship  
 Elsie M. Carper Undergraduate Scholarship Fund  
 Emma K. Carr Scholarships  
 Henry Harding Carter Scholarship  
 Maria M. Carter Scholarship  
 Paul E. Casassa Memorial Foundation Scholarship  
 James Edward Miller Chapman Educational Foundation Scholarship  
 The Chesapeake and Potomac Telephone Company Scholarship  
 Columbian Women Scholarship Funds  
 Victoria Briggs Scholarship Fund



Elizabeth V. Brown Scholarship Fund  
Grace Ross Chamberlin Scholarship Fund  
College Women's Scholarship Fund  
Columbian Women Members' Scholarship Fund  
Arline Hughes Dufour Scholarship Fund  
Dr. Watson W. Eldridge, Jr., and John F. Eldridge Scholarship Fund  
Founders of Columbian Women Scholarship Fund  
Ross Lees Hardy Foundation Scholarship Fund  
Lillian Young Herron Scholarship Fund  
Nellie Maynard Knapp Scholarship Fund  
Marcia B. Kraft Scholarship Fund  
Janet McWilliams Scholarship Fund  
Marie-Louise Ralph Turner Scholarship Fund  
Cora and John H. Davis Scholarship  
Isaac Davis Scholarship  
District of Columbia Daughters of the American Revolution Scholarship  
District of Columbia Institute of Certified Public Accountants Scholarship in  
Accounting  
Estella Constance Drane Scholarship  
Henry Parsons Erwin Scholarship  
Robert Farnham Scholarship  
Federal Government Accountants Association—Washington, D.C., Chapter—  
Scholarship in Accounting  
Esther Brigham Fisher Scholarship  
Dean James Harold Fox Scholarship  
Geico Achievement Award  
Louis E. Giles Memorial Scholarships  
GW Tennis Alumni Association Scholarship  
Gary C. and Leslie Granoff Scholarship Fund  
Mildred Green Memorial Scholarship Fund  
Gridiron Foundation of the Gridiron Club Scholarship  
Isadore and Bertha Gudelsky Family Scholarship  
Anna Spicker Hampel Scholarship  
Theo Campbell Hartman Scholarship  
Elma Lewis Harvey Scholarship  
Hazelton Scholarship  
George F. Henigan Scholarships in Debate  
George Hyman Construction Company Scholarships  
Albert A. and Esther C. Jones Scholarship Fund  
Allen M. Jones Scholarship Fund  
David B. and James L. Karrick, Jr., Scholarship Fund  
Samuel and Elizabeth Kay Scholarships  
Amos Kendall Scholarship  
L. Poe Leggette Memorial Scholarship Established by WRGW  
Thaddeus A. and Mary Jean Lindner Scholarship Fund  
Calvin D. Linton Endowment Scholarship Fund  
Mary and Daniel Loughran Scholarship  
Martha's Marathon Residence Hall Scholarship  
Marshall Memorial Scholarship Fund  
Maud E. McPherson Scholarship  
A. Morehouse Scholarship  
E. K. Morris Education Fund Scholarships  
Helen Marie and Thomas E. Orr Scholarships  
Henry and Caroline Orth Scholarship Fund  
Thornton Owen Scholarship  
Pan-Dodecanesian Association of America Scholarship  
Hardy Pearce Scholarship Fund

James and Theodore Pedas Scholarship  
Phi Delta Gamma Scholarships  
Fred B. and Alma D. Pletcher Scholarship Fund  
Levin M. Powell Scholarships  
Presidential Award in the Performing Arts  
Jack B. Sacks Foundation, Inc., Scholarship  
Henry Whitefield Samson Scholarship Fund  
Scottish Rite of Freemasonry Scholarship Fund  
Cecelia M. Sehrt Scholarship Fund  
Lula M. Shepard Scholarships  
Mildred Shott Scholarship Fund  
Sigma Delta Chi Foundation of Washington, D.C., Scholarships  
Myrna Sislen Guitar Scholarship  
Margaret Lucille Snoddy Scholarship  
David Spencer Scholarship  
George Steiner Scholarship in Music  
Mary Lowell Stone Scholarship  
Charles Clinton Swisher Scholarships  
U.S. Office of Education Traineeships  
University Award for Phi Beta Kappa  
University Players Scholarship in Memory of L. Poe Leggette  
William Walker Scholarship  
Abigail Ann Brown and Henry Kirk White Scholarship Fund  
John Withington Scholarship  
Women's Physical Education Alumnae Association Scholarship  
William G. Woodford Scholarship  
Ellen Woodhull Scholarship  
Zonta Club Scholarship  
Barbara Jackman Zuckert Scholarship Fund for Blind Part-Time Students

#### **Grants**

Fannie Mae/H.D. Woodson High School Grant  
George Washington University Grant  
GW Educational Opportunity Program Tuition Grants  
Key Club of Walt Whitman High School, Bethesda, Md., Grant  
Marriott Foundation Grant  
The Washington Post/Eastern High School Incentive Scholarship Program  
21st Century D.C. Scholars Program

#### **GW Family Tuition Discount Plan**

A student attending George Washington University as a full-time undergraduate who has a sibling also attending GW for the same academic year as a full-time undergraduate may qualify for a GW Family Grant amounting to one half of tuition for the second student. For further information on this program, write to the Office of Student Financial Assistance.

#### **Assistantships**

**Resident Assistantships**—Available to seniors in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Office of Housing and Residence Life.



### Loan Funds

The following loan funds are available to degree students. A separate application must be submitted for all loan programs. Applications for the Perkins Loan Program should be filed no later than February 1 (incoming freshmen) or March 1 (transfers and continuing undergraduate students) for the following academic year. Complete information is contained in the student financial aid pamphlet, which is available from the Office of Student Financial Assistance, George Washington University, Washington, D.C. 20052.

George F. Henigan Loan Fund  
Inner-City Student Loan Fund  
International Student Loan Fund  
Joanne Jacobs Student Loan Fund  
Jessie B. Martin Loan Fund  
Perkins Loan Program  
Barney Plotnick, M.D., Student Loan Fund  
Hiram Miller Stout Memorial Loan Fund  
University Student Emergency Loan Fund  
Edmund W. Dreyfuss Loan Fund  
Peter and Doris Firsht Loan Fund

**Stafford Loans**—George Washington University is an eligible participant in the Stafford Loan Program. Freshmen and sophomores may apply for a maximum of \$2,625 per year; juniors and seniors, a maximum of \$4,000 per year. Students who intend to use the loan for payment of tuition at registration should submit an application, as well as all required supporting documents, no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

**Parent Loan for Undergraduate Students/Supplemental Loans for Students**—George Washington University is also an eligible participant in the Parent Loan for Undergraduate Students Program (PLUS) and the Supplemental Loans for Students (SLS). The interest rate on the loans is variable, based on the interest rate on U.S. Treasury bills, to a maximum of 12%. Repayment begins 60 days after the disbursement of the check. Parents of dependent students may apply for up to \$4,000 per year for each student. Independent students may apply for up to \$4,000 per year on their own behalf. Students who intend to use the loan for payment of tuition at registration should submit an application no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

**The CONSERN Loan Program**, jointly sponsored by the District of Columbia and the Consortium of Universities of the Washington Metropolitan Area, provides supplementary aid to creditworthy students and parents who have financial need remaining after having exhausted benefits from all other federal, state, and institutional aid programs for which they qualify (except CWSP, PLUS/SLS, and HEAL). Applicants must be enrolled at least half time and must demonstrate financial need otherwise unmet. CONSERN loans range from \$2,000 up to the cost of education for the academic year and carry a variable interest rate.

### Student Employment

The University participates in the College Work-Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. In addition, the Career and Cooperative Education Center maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Career and Cooperative Education Center for interviews and referrals to positions for which they are qualified.

### International Students

Undergraduate international students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a B average are eligible to apply for the Board of Trustees Scholarships; those with a C average are eligible to apply for GW Grants. Aid is awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, above.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) was \$21,440 in 1990–1991 and will be substantially higher in 1991–1992; generally speaking, expenses for international students are about \$2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

### Veterans Benefits

The Veterans Benefits office assists students entitled to educational benefits as active-duty personnel, veterans, or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting applications to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and that includes other information of general interest.



## PRIZES

**Abdelfattah Abdalla Prize**—Awarded annually to a junior or senior in the Department of Electrical Engineering and Computer Science for scholarship and service.

**Accountancy Prizes**—Three prizes for academic excellence awarded annually by the Department of Accountancy—one at the undergraduate level, one at the Master of Accountancy level, and one at the Master of Taxation level.

**Morris M. Ain Memorial Prize**—Awarded to a deserving student for excellence in drawing.

**Alpha Chi Sigma Prize**—Awarded annually by the Alpha Pi Chapter to the student who has attained the highest academic record in courses in chemistry. The name and year of graduation of the student is inscribed on a bronze plaque. The winner must have had at least 16 hours in chemistry, including the final semester, at this University.

**American Chemical Society Prize**—Awarded to an undergraduate student who has completed the junior year and who has demonstrated excellence in analytic chemistry.

**American Institute of Chemists Prize**—A medal awarded annually to the graduating student majoring in chemistry who excels in scholarship, integrity, and leadership.

**Norman B. Ames Memorial Prize**—Awarded annually to a graduating senior in the School of Engineering and Applied Science who has made significant contributions to the School and the University.

**Amling Prize**—Established by Dr. Frederick Amling in honor of his parents, Gustav and Elsie Amling, for the best investment report in Business Administration 123, Investment and Portfolio Management.

**Department of Art Prizes**—Two prizes (one for a senior in art history and one for a senior in the fine arts) awarded annually to the most promising students, as determined by the departmental faculty.

**William C. Barbee Prize**—Awarded to a deserving student for excellence in sculpture and sculptural ceramics.

**Perry Botwin Prize**—Awarded annually to an outstanding senior in the program in special education of the School of Education and Human Development.

**The Walter G. Bryte, Jr., Achievement Award**—Provided by Walter G. Bryte, Jr., Colonel, U.S. Air Force (retired), first Professor of Air Science at George Washington University. The award is presented annually primarily to that undergraduate residence hall, secondarily to any other activity at the University, that has shown, under the leadership of its elected or designated head, the most improvement or excellence in its support of the principles and aims of the United States of America and George Washington University. The hall or other activity will be awarded a cash prize, and the name of its leader and the hall or activity will be engraved on a silver trophy.

**Buka Family Prize**—Provided by Ruth Buka in honor of her parents, Georg and Rosa Buka, and her sister, Hilde Buka-Lacour. It is awarded to the most outstanding student in the Department of Germanic Languages and Literatures.

**Byrne Thurtell Burns Memorial Prize**—Awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and who possesses such qualifications of mind and character as to give promise of future achievement.

**Business Administration Prize**—Awarded annually by the business administration departments to the outstanding graduating senior in business administration on the basis of scholarship, leadership, and service to the University.

**Wilbur J. Carr Prize**—Established in 1962 by Edith K. Carr, former Trustee of the University, in memory of her distinguished husband, who was graduated

from the School of Comparative Jurisprudence and Diplomacy in 1899. It is awarded annually to that student in the graduating class of the University who has demonstrated outstanding ability in the study of international affairs and who has given evidence of possessing in marked degree the qualities that produce the good citizen and the dedicated public servant.

**Chemical Rubber Company Freshman Chemistry Achievement Prize**—A Handbook of Chemistry and Physics awarded annually to the freshman student who has demonstrated the greatest achievement in Chemistry 15-16.

**Chemical Society of Washington Prize**—Awarded to an outstanding undergraduate in the junior year who is majoring in chemistry.

**Astere E. Claeysens Prize**—Established in 1981 by the Trustees of the Bess and Arthur Dick Family Foundation. It is awarded for the best original work in playwriting by a student enrolled in the University.

**John Henry Cowles Prizes**—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Free-masonry, Southern Jurisdiction of the United States of America. Awarded upon graduation to the graduate or undergraduate student with the best overall scholastic achievement and leadership potential in the School of Business and Public Management and in the Elliott School of International Affairs.

**DeWitt Clinton Croissant Prize**—Awarded annually to the undergraduate student enrolled in a course in drama or active in University dramatics who submits to the English Department the best essay on drama or the theater.

**E.K. Cutter Prize**—Established by Marion Kendall Cutter "for excellence in the study of English." Awarded to the member of the graduating class whose record in English, combined with general excellence, shows the most marked aptitude for and attainment in English studies.

**Isaac Davis Prizes**—Established in 1847 and awarded annually to the three seniors who have made the greatest progress in public speaking while enrolled in the University. Awards are determined by a public-speaking contest in which the participants deliver original orations. Only members of the senior class of Columbian College of Arts and Sciences who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

**Henry Grattan Doyle Memorial Prize**—Established in memory of Henry Grattan Doyle, a former Dean of Columbian College. Awarded annually to an outstanding senior for excellence in Spanish.

**Elliott School of International Affairs Alumni Prize**—May be awarded annually to a graduate of the Elliott School of International Affairs (graduate or undergraduate degree recipient) who, in the opinion of the Dean and the Faculty, deserves recognition for academic achievement and contribution to the life of the George Washington University and its programs and goals.

**George Ellowitz Prize in Engineering**—Awarded annually to a graduating senior in the School of Engineering and Applied Science who has demonstrated a broad interest in the humanities and social sciences.

**Elton Prize**—Established by the Reverend Romeo Elton, of Exeter, England, and awarded annually to the student with the highest average in the most advanced course in the Greek language and literature.

**Jesse Frederick Essary Prize in Journalism**—Established by Helen Essary Murphy and awarded annually to a student who has given promise of sound citizenship and who submits the best printed and published evidence of ability in "forthright reporting" and good journalistic writing in a student publication or elsewhere.

**Jessie Fant Evans Prize**—A bequest of Joshua Evans, Jr., in 1971, in recognition of his wife's distinguished record at and service to the University, on whose Board of Trustees she served as the first woman member. Awarded annually to an outstanding senior student in a contemporary history course.



**Joshua Evans III Prize in Political and Social Science**—A memorial prize "established by friends because of an outstanding life." Awarded annually to that student in the graduating class "who has demonstrated his/her signal ability in the social and political sciences and who has given promise of the interpretation of that ability in good citizenship among his/her fellows."

**Willie E. Fitch Prize**—Established by James E. Fitch in memory of his son. Awarded annually to a senior student for the best examination in chemistry.

**Alfred Martin Freudenthal Prize**—Awarded annually to the senior in the School of Engineering and Applied Science who graduates with the highest scholastic standing.

**Charles E. Gauss Prize**—Established in honor of Charles E. Gauss, Elton Professor of Philosophy from 1945 to 1964. Awarded annually to a graduating senior for excellence in philosophy.

**Alice Douglas Goddard Prize**—A memorial established by Frederick Joseph Goddard, of Washington, D.C. Awarded annually to the senior student making the highest average in American literature.

**Edward Carrington Goddard Prize**—Established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C., in memory of Edward Carrington Goddard, class of 1881. Awarded to the junior or senior student making the highest average in French language and literature.

**Morgan Richardson Goddard Prize**—A memorial established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C. Awarded to the junior or senior student making the highest average in the following fields: business administration, economics, international business, or public accounting.

**Harmon Choral Prize**—Awarded annually for significant musical accomplishment and outstanding contribution to the choral program.

**Ching-Yao Hsieh Prize**—Two prizes awarded annually, one to an undergraduate and one to a graduate student in the Department of Economics.

**Gardiner G. Hubbard Memorial Prize in United States History**—Established by Gertrude M. Hubbard in memory of her husband and awarded annually to that member of the graduating class majoring in history who has maintained the highest standing in courses in United States history.

**Human Services Program Prize**—Awarded by the Department of Human Services to a graduating senior who best exemplifies the attributes of service to the profession and academic achievement while a student at the University.

**Cecille R. Hunt Prize**—Offered annually to deserving art students and every two or three years to participants in the University's Art Alumni Exhibition.

**International Business Prize**—Two prizes awarded annually by the School of Business and Public Management to students specializing in international business, one awarded to a graduating senior and one awarded to a graduate student.

**David Lloyd Kreeger Prizes in Art**—Eight prizes given by Mr. Kreeger, six in the fine arts and two in art history (including museology). Fine arts prizes are awarded to a senior or graduate student in painting, sculpture, printmaking, ceramics, photography, and visual communication. One prize in art history is awarded to a senior and one to a graduate student. Candidates for the prizes must submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

**Minna Mirin Kullback Memorial Prize**—Established in 1968 by Solomon Kullback in memory of his wife. Awarded annually by a committee of faculty members of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 credit hours of statistics courses by the end of the spring semester.

**John Francis Latimer Prize in Classics**—Established in 1973. Awarded to a graduating senior who has made the most outstanding record as a major in the Department of Classics.

**Martin Mahler Prize in Materials Testing**—Awarded to the upper-division or graduate student in engineering who submits the best reports on tests in the materials laboratory course, with preference given to prestressed concrete tests.

**Hilda Haves Manchester Prize in Sociology**—Established in honor of Hilda Haves Manchester, B.A. 1932, an outstanding student whose major field was sociology. Awarded annually by Columbian College of Arts and Sciences to the senior student majoring in sociology who has the highest scholastic record.

**The Barry Manilow Endowed Prize in Music**—Established in 1983. Awarded annually to a student majoring in music. The award is made on the basis of academic performance and musical ability, as determined by a committee of faculty appointed by the chair of the Music Department.

**Vivian Nellis Memorial Prize**—Awarded to a student in the English Department who has shown special promise in the field of creative writing.

**Phi Delta Kappa Prize**—Awarded annually by the George Washington University Chapter to an outstanding senior in a teacher education program in the School of Education and Human Development.

**Phi Eta Sigma Prize**—A choice book selected from the field of the recipient's major, awarded annually by the George Washington University Chapter to the student attaining the highest scholastic average in the first full semester of work. The winner's name is engraved on a plaque in the Office of the Dean of Columbian College of Arts and Sciences.

**Pi Lambda Theta Prize**—Awarded annually by Alpha Theta Chapter to an outstanding senior in a teacher education program in the School of Education and Human Development.

**Psi Chi Prizes**—Two prizes awarded annually by the George Washington University Chapter to the best undergraduate student in experimental psychology and to the M.A. degree candidate or second-year graduate student submitting the best thesis or research project in psychology.

**Ruggles Prize**—Established by Professor William Ruggles in 1859. Awarded annually to a candidate for a bachelor's degree for excellence in mathematics.

**Howard C. Sacks Prize**—Awarded to a student in political science who has demonstrated outstanding academic achievement in the study of Far Eastern affairs.

**Hermann and Johanna Richter Schoenfeld Prize**—Established in grateful appreciation of the inspired teaching and devotion to his students of Dr. Hermann Schoenfeld, who for more than 20 years until his death in 1926 headed the Department of German. Hermann Schoenfeld, Ph.D., LL.D., was widely recognized as a scholar of distinction whose presence on the faculty added prestige to the University. This prize is given annually to a member of the graduating class for excellence in historical and cultural phases of German studies.

**Julian H. Singman Prizes**—Two prizes awarded annually, one in design and one in aquarelle painting.

**Walton E. Smith Memorial Prize**—Awarded annually by the Department of Management Science to a graduating student for outstanding performance in the field of information systems technology. The award is given to a student who has demonstrated exceptional performance on the comprehensive examination, in course work, and in contributions to the program by other means.

**Staughton Prize**—Established by the Reverend Romeo Elton and awarded annually to the student making the best record in the most advanced courses in Latin language and literature.

**Alfred E. Steck Memorial Prize**—Awarded for proven excellence in the field of sculpture.

**James MacBride Sterrett, Jr., Prize**—Established in 1911 by Professor Sterrett in memory of his son. Awarded annually to the student who obtains the highest average in Physics 1 and 2.



*Charles Clinton Swisher Historical Club Prize*—Established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Swisher. Awarded annually to the student who submits the best essay covering some phase of medieval history.

*Tau Beta Pi Outstanding Sophomore Prize*—Awarded annually to the School of Engineering and Applied Science student who ranks first in his or her class at the completion of the sophomore year.

*Geza Teleki Prize*—Awarded for outstanding work in the geological sciences.

*The Wall Street Journal Leadership Prize*—Awarded annually to a graduating senior with a major field of study in finance within the Bachelor of Business Administration degree for outstanding academic performance and service to the University.

*Thomas F. Walsh Prize*—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

*Alexander Wilbourn Weddell Prize*—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a degree candidate who writes the best essay on "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

## UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

### Registration

Information on registration procedures is stated in the *Schedule of Classes*, which is available in advance of each semester.

Registration in on-campus courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as those students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the college, school, or division in which they are registered in this University. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations have been met.

### **Eligibility for Registration**

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of Continuing Education when space is needed for degree candidates.

**New Student**—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered in the University who was not registered on campus during the preceding semester must apply for and be granted readmission by the appropriate admitting office before he or she is eligible for registration.

**Continuing Student**—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

### **Completion of Registration**

Registration is not complete until financial obligations have been fulfilled. Attendance in class is not permitted until registration has been completed.

### **Program Adjustment (Add/Drop)**

The program adjustment period begins the first day of classes. Program adjustment requires the approval of an advisor.

### **Registration for Consortium Courses**

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

### **Student Status**

For the purpose of defining student status, undergraduates taking 12 or more credit hours are considered to be full-time students. All other undergraduates are considered to be part time.

### **Attendance**

Students may attend only those classes for which they are registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

### **Scholarship Requirements**

Students who fail to maintain the scholarship requirements of the college, school, or division in which registered may be dismissed from the University.

### **Grades**

Grades are mailed to students through the Office of the Registrar at the close of each semester. They are not given out by instructors or released over the telephone. The following grading system is used: A, Excellent; B, Good; C, Satisfactory; D, Low Pass; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal;



Z, Unauthorized Withdrawal; P, Pass; NP, No Pass. Excluding the School of Engineering and Applied Science, other grades that may be assigned are A -, B +, B -, C +, C -, D +, and D -. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of D or better was received, unless required to do so by the department concerned. A written statement, indicating that the student is required to repeat the course, must be submitted to the student's dean by the appropriate department chair.

#### **Incomplete/Authorized Withdrawal**

When another grade has not been assigned, the symbol I (Incomplete), the symbol W (Authorized Withdrawal), or the symbol Z (Unauthorized Withdrawal) will be recorded. The symbol I indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of I may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of Z is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

#### **Changing a Grade of Incomplete**

For information concerning changing a grade of Incomplete, consult the regulations of the college, school, or division concerned.

#### **The Grade-Point Average**

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: A, 4.0; A -, 3.7; B +, 3.3; B, 3.0; B -, 2.7; C +, 2.3; C, 2.0; C -, 1.7; D +, 1.3; D, 1.0; D -, .7; F, 0, for each credit hour for which the student has registered in a degree program. Courses marked CR, I, IP, P, NP, W, or Z are not considered in determining the average, except that courses marked I will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

#### **Final Examinations**

Final examinations for undergraduate courses are scheduled by the Office of the Registrar.

#### **Academic Dishonesty**

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper

academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

### **Student Conduct**

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained at the office of Judicial Affairs. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### **Withdrawal**

Withdrawal from a course or from the University requires the permission of the dean of the college, school, or division in which the student is registered. A grade of W will be recorded on the student's academic record. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see *Payment of Fees*).

Each college, school, and division of the University sets deadline dates for each semester concerning withdrawal. Withdrawal between these dates and the end of the semester is permitted only in exceptional circumstances.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations. Unauthorized withdrawal will result in the recording of a grade of Z for the course or courses.

### **Changes in Program of Study**

*Changes Within a College, School, or Division*—A student may not substitute one course for another, drop courses (see *Withdrawal*, above), or change status from credit to audit or from audit to credit without the approval of the dean of the college, school, or division in which registered. Change from one section to another of the same course may be made with the approval of the dean and the department concerned. Change from one major field to another within the same college or school may be made with the approval of the dean.

*Transfer Within the University*—Application for transfer to another college, school, or division must be made to the appropriate admitting office on the form provided by the office concerned. Students transferring within the University are advised to study carefully the requirements listed below under Graduation Requirements and to note that unless otherwise specified, in all undergraduate divisions, 30 credit hours, including at least 12 credit hours in the major field, must be completed while registered in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements that must be fulfilled. A maximum of 45 credit hours earned in the Division of Continuing Education may be applied



toward a bachelor's degree in the other degree-granting colleges or schools of the University.

### **Credit**

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the college, school, or division concerned.

**Auditing**—A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.

### **Post-Admission Transfer Credit**

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

### **Transcripts of Record**

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. A fee of \$3 is charged for each transcript. Partial transcripts are not issued.

### **Continuous Enrollment**

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below) or be assigned by the dean to inactive status (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

### **Leave of Absence**

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

### **Inactive Status**

Under the regulations established by each school and college, a student may be considered in continuous pursuit of the degree while not enrolled in courses at the University when engaged in the following: cooperative engineering work semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete was received; or non-course instructional activities unique to the particular school or college.

Students must request to be enrolled in inactive status, in advance of the year or semester concerned, and be granted approval by their dean for the specific

activity desired. This status is generally limited to one year; no fees are assessed students while in this status.

### **Graduation Requirements**

**Degrees are conferred in February, May, and September.**

To be recommended by the faculty for graduation a student must have met the admission requirements of the college or school in which registered; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which registered; filed an application for graduation prior to the published deadline date; and be free from all indebtedness to the University. Enrollment is required for the semester or summer session at the close of which the degree is to be conferred.

**Application for Graduation**—An Application for Graduation form must be filed at the time of registration for the last semester or summer session of the senior or final year. Students completing degree requirements during the summer sessions will be awarded diplomas (no formal convocation) dated September 30, provided they have completed all degree requirements and have applied for graduation as a part of registration for the summer sessions.

**Scholarship**—The student must meet the scholarship requirements for the particular degree for which registered.

**Curriculum**—Minimum curriculum requirements for each degree are stated under the college or school offering work in preparation for the degree.

**Residence**—Unless otherwise specified, in all undergraduate divisions of the University, a minimum of 30 credit hours, including at least 12 hours in the major field, must be completed while registered in the school or college from which the degree is sought. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the dean of the college or school concerned to pursue work elsewhere, the work of the senior or final year must be completed in the college or school from which the degree is sought.

### **Honors**

Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: *cum laude*, 3.4–3.59; *magna cum laude*, 3.6–3.79; *summa cum laude*, 3.8–4.0.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and diploma of those students who earn an honors designation. The grade-point average includes all course work completed at GW and is not rounded off. To be eligible for an honors designation, a student must complete at least 60 hours of course work at GW.

### **Special Honors**

Special Honors may be awarded by the faculty to any member of the graduating class for outstanding achievement in the student's major field on recommendation of the major department. The student must fulfill all of the following requirements:

1. Candidacy for Special Honors must be approved by the faculty member representing the major department or field not later than the beginning of the senior year.
2. Such other conditions as may be set at the time the candidacy is approved must be met.
3. At least one-half of the courses required for the degree must have been completed at GW.
4. The specific requirement of the college or school in which the student is



registered must be fulfilled as follows: (a) Columbian College of Arts and Sciences or the Elliott School of International Affairs—grades of A or B in 50 percent of the courses taken at GW; (b) the School of Engineering and Applied Science, the School of Education and Human Development, or the School of Business and Public Management—a grade-point average of at least 3.0 on all course work taken at GW.

Special honors awards may not necessarily appear on diplomas.

### **The Library**

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use.

The loan period for stack books is 21 days. Any book that circulates is subject to recall by the library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

### **Right to Dismiss Students**

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

### **Right to Change Rules**

The University and its college, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

### **Right to Make Changes in Programs**

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

### **University Policy on the Release of Student Information**

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin;

dates of attendance; school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

#### **Property Responsibility**

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the Security Office.

#### **University Policy on Drugs**

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.



## **STUDENT SERVICES**

### **Office of the Dean of Students**

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, and assists in nonacademic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office. The Office of the Dean of Students oversees many of the student services listed below, including Housing and Residence Life, the Student Health Service, the Counseling Center, Disabled Student Services, International Student Services, the Multicultural Student Services Center, the Office of Campus Life, and the Career and Cooperative Education Center.

### **Housing and Residence Life**

Complete information concerning the University's residence halls is available from the Director of Housing and Residence Life, George Washington University, Washington, D.C. 20052.

Admission to the University does not include a room reservation. The student will receive, with the notification of acceptance, University residence hall information, an application for residence hall space or apartment accommodation, and a declaration of intent to attend the University. The application for residence hall space or apartment accommodation must be accompanied by a \$300 nonrefundable deposit. The housing deposit is credited toward the first semester's room or apartment charge.

Rooms and apartments are leased for the academic year, and lease payment must be made in early June for the fall semester, unless the student elects the 10-month payment plan. Please check with Student Accounts for the 10-month payment plan.

Residence hall space and apartment accommodations are not generally available to graduate students.

Prices per person for the academic year 1991-92 are scheduled to range from \$3,580 to \$4,150 in the regular residence halls and from \$3,880 to \$4,470 in the apartment residence halls.

### **Food Service**

Resident freshmen and sophomores are required to choose one of the following food service plans: the any 14 meals per week plan, tentatively set at \$2,610 for the academic year, or the any 10 meals per week plan, tentatively set at \$2,460 for the academic year. Participation in the food service plans is optional for junior, senior, and graduate students. Food service payment does not cover University intersession or vacation periods. All meal cards admit bearer to the dining room in Thurston Hall and to the second-floor contract dining room in the Cloyd Heck Marvin Center. A small percentage of the meal card may also be used on a cash basis in the Marvin Center first-floor cafeteria, George's, and the Courtyard Cafe at Mitchell Hall.

Students who observe the Jewish dietary laws can write to make arrangements with the GW Housing and Residence Life Office regarding the B'nai B'rith Hillel Foundation Kosher Meal Plan.

### **Student Health Service**

The Student Health Service is an outpatient clinic located in the Ambulatory Care Center, ground floor.

The Health Service is staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be arranged by appointment or, during certain hours, secured on a walk-in basis. Many routine lab tests may be performed in the Health Service lab at cost; allergy shots, immunizations, and various lab tests are done at little or no charge. Psychiatric evaluation, crisis intervention, and short-term therapy are available by appointment.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Engineering Education Program are not eligible. The bills incurred from all services rendered outside of the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

### **Health and Accident Insurance**

The University has arranged for and endorsed group health and accident insurance, on an elective basis, for all students. Interested students should contact the Student Health Service or Office of the Dean of Students.

### **Counseling Center**

The Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their educational goals. Services include (1) short-term individual counseling, art therapy, crisis intervention, and referral services for personal problems (e.g., academic pressures, relationship or family difficulties); (2) group counseling for personal problems; (3) educational/vocational counseling and testing; (4) workshops designed to address academic or personal development (e.g., test-taking strategies, study skills, communication skills, stress management); (5) consultation with faculty, staff, and student groups about their special needs in designing programs to improve the campus environment.

The Center administers the Miller Analogies Test, GW admissions tests, and special assessments for business and industry. Career counseling and referral services are available to GW faculty, staff, alumni, and individuals from the greater Washington community.

Disabled students are asked to call ahead so that arrangements can be made to adapt services or to meet at an accessible site.

### **The Reading Center**

The Reading Center offers individual assessment and programming services for the preschool through adult years, emphasizing improvement in all areas of literacy development.

### **The Speech and Hearing Center**

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent.



Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

### **The Writing Center**

The Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

### **Computer Information and Resource Center**

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM-PC, Apple Macintosh, and IBM mainframe computers. The CIRC computer laboratories are open seven days a week: 24 hours a day during the academic year and all day and evening at all other times. CIRC also maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session.

In cooperation with the Gelman Library, GW Television, and Telecommunications Services, CIRC publishes a periodic newsletter on computing issues. CIRC gives seminars and offers technical advice to faculty and students regarding use of the IBM mainframe, IBM personal computers, Apple Macintosh personal computers, and the GW Data Network. Students and faculty may receive assistance from CIRC for microcomputer selection and acquisition. CIRC administers and can make recommendations on various discount-purchase programs for microcomputer equipment.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

### **Career and Cooperative Education Center**

The Career and Cooperative Education Center provides career planning and job-seeking assistance as well as a cooperative education program to students and alumni. Services include full-time and part-time job listings; career consulting; workshops (e.g., organizing job searches, resume and letter writing, effective interviewing); a resource library of career field and employer literature; on-campus interviews for students within one year of graduation; a resume referral service; resume critiques; a call-in job listings service; and a credentials service that supports employment and graduate/professional school applications. Cooperative education integrates academic study with related professional work experience. Students apply the theory learned in the classroom to work settings directly related to their career interests. Cooperative education offers an educational strategy whereby students engage in the campus classroom and the world-of-work "laboratory," alternating their academic programs with sustained periods of study-related, employer-paid work.

### **International Services Office**

International students, scholars, faculty, and staff are provided assistance through the International Services Office. The staff offers advising and counseling for a variety of personal problems, including cultural adjustment, living conditions, budgets, academic concerns, and financial aid; immigration assis-

tance and information on government requirements and regulations specific to the international community; and orientation programs to help with adjustment to living and studying in the United States.

#### **Disabled Student Services**

The Disabled Student Services office works to assure that the special services necessary for disabled students to participate fully in their academic programs and the extracurricular life of the campus are provided for them through University or community resources.

#### **Multicultural Student Services Center**

The Multicultural Student Services Center provides academic, co-curricular, and personal support services for all GW minority students to enhance minority student life at GW. Through the Center, minority students receive orientation to the various University resources, and are made aware of the many cultural activities and programs that exist on campus and in the greater metropolitan area. The Center provides professional and peer counseling, course advising, tutorial services, and campus and community mentoring programs. The staff is available to address students' academic and personal concerns.

In addition, the Center enhances the quality of ethnic minority student life through the sponsoring of co-curricular activities, leadership training, and a periodic newsletter. The Center houses a resource center with computers for student use, reference books and instructional materials, a test file, and an information center. The Multicultural Student Services Center oversees the Educational Opportunity Program and various preparatory and precollege programs.

#### **Educational Opportunity Program**

The Educational Opportunity Program (EOP), a component of the Multicultural Student Services Center, provides selected District of Columbia students with financial aid, academic support services, and personal advising to assist them in pursuing undergraduate work at George Washington University. The EOP staff coordinates a precollege program as well as educational and cultural activities to promote the success and enhance the experience of program participants.

The EOP staff administers the High School/College Internship Program (HI/SCIP), which enrolls highly motivated District of Columbia high school seniors. Participants enroll at GW as nondegree candidates, taking a maximum of 6 credit hours per semester in addition to their high school curriculum. Application to the HI/SCIP program is made through the student's high school guidance office. Counseling and advising is provided by the staff, and HI/SCIP students have access to all of the academic support services available to EOP participants.

#### **Office of Campus Life**

The Office of Campus Life offers programs, services, and facilities that provide opportunities for personal, professional, social, and cultural development. The Office of Campus Life includes the Campus Activities Office, Cloyd Heck Marvin Center, and New Student Programs and Services. Staff members assist individual students, campus organizations, and the University community with event planning, program coordination, and participation in special projects. The staff can also help in interpreting University policies and procedures that affect campus activities. Additional information about the services offered by the Office of Campus Life, and about the various student organizations and committees, can be obtained from the *Student Handbook*.



### **Campus Activities Office**

The Campus Activities Office provides administrative support to the University Program Board and other groups planning major events. Other services include advisement of campus organizations (including fraternities and sororities), registration of student organizations, leadership training, and planning and coordination of major campus events.

**Program Board**—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

**Student Government**—The George Washington University Student Association is comprised of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and colleges, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

**Student Organizations**—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 200 registered organizations on campus, covering a broad spectrum of interests, including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

### **The Cloyd Heck Marvin Center**

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes five dining locations, lounges, recreational facilities, a theatre, study rooms, conference and meeting rooms, the Off-Campus Housing Resource Center, the Information Center, and a typing/microcomputer center. The Marvin Center provides facilities for programs conducted by the University Program Board, by the academic departments that include the performing arts, and by other University organizations.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

### **Religious Life**

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling. Religious services and special observances are also provided for the University community as announced.

### Major Program Events

**Art Exhibits**—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade art gallery of the Marvin Center. Student art exhibits are presented each semester.

**Concert Series**—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

**Dance**—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

**Glee Club, Jazz Band, and Orchestra**—The University Glee Club, Jazz Band, and Orchestra are available to students either as credit courses or as cocurricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

**International Programs**—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

**Program Board**—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

**Theatre**—The University Theatre produces four or five major plays and musicals during the year on the proscenium/thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

### Department of Athletics and Recreation

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; wrestling, gymnastic, and weight rooms; handball and squash courts; and a sauna and lockers. Based in the Smith Center, the Department of Athletics and Recreation offers a broad program of intramural and recreational activities designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association and the Atlantic Ten Conference. Its women's and men's intercollegiate varsity teams compete against major universities throughout the Midwest and Eastern Seaboard in such sports as basketball, baseball, soccer, tennis, golf, wrestling, crew, swimming and diving, water polo, badminton, volleyball, and gymnastics.



## **SPECIAL PROGRAMS**

### **Secondary Fields of Study**

A program of secondary fields of study has been established within the University to provide opportunities for formal interschool study. Students must be enrolled in a degree program and must be in good academic standing to be eligible to take a secondary field in another school. The secondary fields consist of 12 to 18 hours of prescribed courses, depending on the field, with scholarship requirements determined by the school offering the field. Upon satisfactory completion of all requirements, the title of the secondary field of study and the courses taken in support of the field are entered on the student's transcript. For further information, see the brochure "Secondary Fields of Study" available in the offices of the deans or from the Vice President for Academic Affairs.

### **University Honors Program**

The University began an undergraduate honors program in the spring 1990 semester. Columbian College of Arts and Sciences, the Elliott School of International Affairs, and the School of Business and Public Management participate in the University Honors Program. Through the office of the Vice President for Academic Affairs, the program offers a University Symposium for the entire University community and honors courses and special events for students in the program. **Honors courses are listed under Courses of Instruction.**

Students must apply for admission to the University Honors Program. Generally, entering freshmen will have high SAT scores and be at or near the top of their high school classes. Applications from other promising students of unusual talent will be seriously considered. Students may apply for entrance to the program as sophomores.

To remain in the program and to graduate with recognition from the program, students must meet specific grade-point average requirements that increase in successive years.

### **Honor Societies**

Honor societies that maintain active chapters at George Washington University include Phi Beta Kappa and Sigma Xi as well as those specific to given academic fields, such as Alpha Epsilon Delta, Beta Alpha Psi, Beta Gamma Sigma, Delta Phi Alpha, Eta Kappa Nu, Omicron Delta Epsilon, Omega Rho, Pi Alpha Alpha, Pi Sigma Alpha, Pi Tau Sigma, Psi Chi, Sigma Delta Pi, and Tau Beta Pi. The freshman honor society Phi Eta Sigma is open to qualified students in all undergraduate programs.

### **Study Abroad Programs**

Study abroad programs for the academic year are currently available in England, France, Germany, Japan, China, and Peru. Students who wish to study in countries not mentioned here should check with the office of the dean of their school or the Study Abroad Office in the Elliott School of International Affairs. Credits earned with acceptable grades are transferable toward the appropriate degree at George Washington University, provided there is no duplication of work done previously. All programs of study abroad must be approved on the required forms by the appropriate faculty and administrative personnel before departure.

Study abroad is available at varying locations during the summer. Information on summer programs abroad is available in the GW Summer Sessions Announcement.

### ROTC

See Naval Science under Courses of Instruction for the NROTC program at George Washington University.

George Washington University students may enroll through the Consortium in the Army ROTC program offered at Georgetown University, the AFROTC program at the University of Maryland, or the Army ROTC or AFROTC at Howard University. Those interested should contact the ROTC enrollment officer at one of these universities. Limited credit for such courses (primarily advanced ROTC) may be assigned for electives to meet degree requirements at George Washington University; prior approval is required by the dean of the school in which the student is enrolled.



## COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Dean R.W. Kenny

Associate Deans D.W. McAleavey, N.K. Khatcheressian, C.J. Deering

Director of Academic Advising B.P. Selinsky

### Introduction

Since its founding in 1821, Columbian College, the college of liberal arts and sciences of George Washington University, has been the cornerstone of a dynamic campus community in the heart of the nation's capital. With fine facilities and a full-time faculty of about 300, the College offers its 3,500 students the advantages of a small liberal arts institution as well as opportunities for professional and pre-professional education in many fields and for internships and employment in a stimulating urban environment. The College's students come from all 50 states and from about 100 foreign countries.

The rich and diverse liberal arts and sciences curriculum is designed to strengthen the student's ability to communicate, to reason, and to understand the social and physical environment. This purpose is accomplished through the study of various disciplines—the humanities, the social sciences, and the mathematical and natural sciences. With this foundation, Columbian College graduates are well prepared for a wide range of jobs or for more specialized professional and graduate education. The College offers programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music. Students may elect one of more than 50 departmental majors, or they may elect double majors, interdisciplinary majors, or individualized degree programs. Special curricular guidance is given to students planning to apply to a medical or law school.

### Entrance Requirements

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics



beyond introductory algebra. Typically, at least a B average or equivalent is required.

2. The principal's statement that the applicant is prepared to undertake college work.

3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on either the Scholastic Aptitude Test or the American College Testing battery.

4. Admission to the Bachelor of Music curriculum requires, in addition to the above, a performance audition (a tape is acceptable) and/or music testing.

It is recommended that the College Board examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

The Dean's Council will consider the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all of the formal requirements stated here. The Council may prescribe appropriate scholastic aptitude tests. Students admitted with deficiencies in secondary school units will be required to begin removing such deficiencies within the first year, by appropriate courses or examinations.

### Admission With Advanced Standing

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows.

Applicants who have accumulated at least 30 credit hours (or the equivalent) of academic credit at another regionally accredited college or university may be admitted to Columbian College as transfer students with advanced standing. Those who have achieved a grade-point average of at least 2.5 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 credit hours of acceptable credit must meet the entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of C or above, provided that such courses are comparable to the curriculum requirements for the degree sought in Columbian College. No more than 9 credit hours of professional (engineering, education, business) courses completed at another institution will be assigned toward a degree in Columbian College. In the case of course work completed at a two-year college, no more than 66 credit hours of credit may be applied as advanced standing toward a degree in Columbian College.

Although a grade of D in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of D will not, however, be assigned as advanced standing.

Columbian College reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students wishing to transfer from another division of the University into a degree program in Columbian College must submit to the Office of Admissions a

formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.0 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of Continuing Education may be applied toward a degree in Columbian College.

All transfer students must satisfy the residence and course requirements for degrees awarded by Columbian College.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **Advisory System**

Students have the responsibility for determining their schedules and meeting degree requirements. Because faculty and staff advisors can help students learn to make well-informed choices, students are required to meet with an advisor prior to registering each semester and are encouraged to keep in close touch with their advisors. Students who have not yet declared a major receive academic advising in the Columbian College Student Services office; students who have declared their majors receive advice from their departments or from their inter-departmental committees.

In addition to the academic advising provided by the faculty and the College's professional staff, the peer advising system allows students to consult with peer advisors who have been specially trained to help students make informed choices as they construct their schedules each semester. A directory of peer advisors is available from the Student Services office.

Personal counseling is available through the office of the Dean of Students, the Counseling Center, the Multicultural Student Services Center, the International Services office, and elsewhere.

Students having academic difficulty, especially freshmen and sophomores taking lower-level courses who receive mid-semester warnings from their professors, should immediately consult with their professor or advisor in order to develop a plan for overcoming their problem. The Writing Center in the English Department and the Math Lab in the Mathematics Department both offer walk-in and by-appointment assistance; peer tutors are available through the Dean of Students office; study skills workshops are provided by the Counseling Center.

### **Scholarship Requirements**

#### **Academic Work Load**

To encourage academic performance of high quality, the College limits the student's work load.

A full-time student not on probation may take a course load of as much as 17 credit hours. The amount of work taken by a student on probation will be limited by the Dean's Council.

A full-time student who, during the immediately preceding semester, has received no grades below B- and has earned grades of A or A- in three courses totaling at least 9 credit hours may take 18 or 19 hours.

A student who accepts employment after registration or at any time during a semester must immediately report that fact to the dean so that the academic program may be adjusted, if necessary. A student employed 20 or more hours per week should not attempt more than 10 credit hours per semester or 4 credit hours per summer session.

#### **Attendance**

The student is held responsible for all the work of the course in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up work missed.



### Classification of Students

A student becomes a *sophomore* upon completion of 30 credit hours, a *junior* upon completion of 60 credit hours, and a *senior* upon completion of 90 credit hours.

An *unclassified* student is one who is not a candidate for a bachelor's degree (normally because the student already holds one) but who wishes for valid academic reason to take a limited program for a limited time.

### Leave of Absence and Continuous Enrollment

Students in Columbian College who wish to interrupt their studies must apply to the dean for either Continuous Enrollment or Leave of Absence (see University Regulations). If approved, either form of inactive status assures the student that, for at least one semester, re-entrance to the College may take place under regulations prevailing at the time of last registration. A student may re-apply for a second semester of either type of leave, but ordinarily such leave is only available for one calendar year. After two semesters of inactive status, the student is expected to resume active study toward a degree.

All study toward a degree program at any other college or university, in this country or abroad, undertaken by a continuing student must be approved by the dean in advance.

### Academic Standing

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 credit hours or more) during the fall or spring semester. Students enrolled for less than 12 credit hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their cumulative record, a "semester" being considered a time interval in which at least 12 credit hours have accrued.

**Probation**—A student whose cumulative grade-point average is less than 2.0 (but 1.0 or more) after attempting a minimum of 24 credit hours will be placed on probation. The course load of a student on probation shall be no more than 13 credit hours. Probation will be removed if, after a first or second semester on probation, the student's grade-point average is raised to 2.0 or more. A student still on probation after two semesters (or 24 credit hours attempted) ordinarily will be suspended but may be continued on probation by the Dean's Council (see below).

**Suspension**—The following circumstances constitute grounds for suspension: (1) a cumulative grade-point average below 1.0 after attempting a minimum of 24 credit hours, and (2) failure to attain a cumulative grade-point average of 2.0 or more after two successive semesters (or 24 credit hours attempted) on probation. The Dean's Council may continue a student on probation (in lieu of suspension) if satisfactory progress is demonstrated during the probationary period and/or sufficient evidence of academic promise, by way of a statement of appeal, is offered by the student.

The minimum period of academic suspension is one fall or one spring semester. Final dates for applying for readmission are the same as those governing undergraduate admission (see Admissions). A suspended student seeking readmission must submit evidence to the Dean's Council of conduct during absence from the University that indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

**Semester Warning**—A student whose cumulative grade-point average is less than 2.0 after attempting a minimum of 12 credit hours will be issued a warning

notice at the end of the semester by the Office of the Dean and shall be strongly advised to take corrective measures (e.g., limitation of course load to no more than 13 credit hours).

**Mid-semester Warning**—When, at the end of the eighth week of each semester, instructors file in the Office of the Dean the names of freshman and sophomore students who are doing unsatisfactory work, a notice of warning is sent to the student and a copy filed with the appropriate advisor. A warning constitutes notice to the student to consult the instructor and advisor at the earliest opportunity.

### **Adding and Dropping Courses**

After registering, a student may add or drop courses only by means of procedures established by the Registrar. Failure to follow these procedures when dropping a course may result in a failing grade. The deadline for adding a course during the regular fall or spring semester is the end of the second week of classes.

The deadline for dropping a course without academic penalty is the end of the eighth week of classes in the fall and spring semesters. A course dropped during the first four weeks of classes will not appear on a student's transcript. A course dropped after the fourth week but before the end of the eighth week will be assigned the grade of W (authorized withdrawal).

The deadline for complete withdrawal from a student's entire program of courses without academic penalty is the end of the ninth week of classes.

After the deadlines, program changes are not possible unless the student presents a petition to the Dean's Council and receives permission.

### **Incompletes**

Conditions under which the grade of I (Incomplete) may be assigned are described under Regulations.

**Changing an Incomplete**—Incomplete work must be completed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of I is assigned. When work for the course is completed, the grade earned will be indicated in the form of I/ followed by the grade. The indication of I/ cannot be removed from the transcript. A grade of I that is not changed within this period automatically becomes an I/F. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean or the appropriate committee for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of I cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

### **Dean's List**

The name of any student who takes 15 credit hours or more of graded course work in any one semester and attains a semester grade-point average of 3.5 or more with no grades below B – will be placed on the Dean's List for that semester. A course taken on a Pass/No Pass basis beyond the 15-hour minimum of other courses does not affect the student's eligibility for the Dean's List, nor are the credit hours of such a course computed in the above figures. A grade of No Pass, however, disqualifies the student from the Dean's List.



## **The Bachelor's Degrees**

Columbian College offers programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music.

In cooperation with the School of Medicine and Health Sciences, a seven-year curriculum leading to the combined degrees of Bachelor of Arts and Doctor of Medicine is offered.

For teacher preparation courses for Columbian College students, see the School of Education and Human Development.

### **The Standard 120-Credit-Hour Program**

One hundred twenty hours of course work must be passed and a grade-point average of at least 2.0 achieved in courses graded on a 4.0 scale. General curriculum, major, and other requirements described below must be met.

Each student must declare a major, usually in the sophomore year. A student may change the major with the consent of the dean and of the department or committee concerned; the student must meet the requirements for the new major in effect at the time the change is approved. At least 60 hours of course work must be taken outside the major-field department or major program. (This does not apply to the Bachelor of Arts curriculum in dance nor to the 129-hour Bachelor of Music curriculum.)

See Scholarship Requirements under University Regulations for an explanation of how the grade-point average is computed. See Scholarship Performance in the Major, below, for requirements applicable specifically to major programs.

All students, including those transferring from other institutions or from another school or division of this University, with major requirements wholly or substantially met, must satisfy the residence requirement of Columbian College stated below.

### **The 90-Credit-Hour Program**

The 90-credit-hour degree program is designed for the exceptionally able student. This program, which leads to the regular Columbian College degrees, makes it possible to graduate in three normal academic years with a total of 90 credit hours of credit instead of the standard 120. Students in this program must complete all of the requirements for the three-year degree in the semester in which the 90th credit hour is achieved.

The requirements for this program are (1) 90 credit hours of credit earned in college courses (that is, the 90-hour requirement may not be reduced by credit earned through examinations); (2) completion of the chosen major-field program and general curricular requirements; (3) grades of A or A- in at least 45 credit hours of course work and no grades below C-; (4) at least 60 credit hours of credit earned in 100-level courses; and (5) recommendation of the major department or program.

To be eligible for this program, the student must show evidence of exceptional academic ability by college record, performance in college courses, and other appropriate information.

An interested student should make application directly to the major-field departmental chairman or program director as soon as possible, preferably by the end of the first year of study. The student's academic record to that point will, of course, provide a useful criterion of eligibility.

A transfer student may qualify for graduation under the 90-hour program if he or she completes at least 60 credit hours of the approved 90-hour program in Columbian College, earns grades of A or A- in no less than 45 credit hours of such course work at this University, and has no grades below C-.

A student who fails to maintain the required academic performance while studying toward the 90-hour degree program simply continues for the standard 120-hour degree.

### **Residence**

*For the Standard 120-Credit-Hour Program*—Students must complete 45 of their final 60 hours toward their degrees in the College. (Students approved for study abroad, however, must complete 45 of their final 75 hours in the College.) Except in special circumstances, and then only with the approval of the Dean, at least 9 of the final 15 hours must be completed in residence.

Courses applicable to the degree taken while registered in any division of The George Washington University in the semester immediately prior to admission to degree candidacy in Columbian College are counted as courses in residence.

*For the 90-Credit-Hour Program*—The last 60 credit hours, including at least 12 hours in the major field, must be completed in residence in Columbian College.

*Summer Work*—Summer work in residence may be counted toward all Columbian College degrees.

### **Combined Degrees of Bachelor of Arts and Doctor of Medicine**

A candidate for the combined degrees of Bachelor of Arts and Doctor of Medicine must (1) complete the entrance requirements for the Doctor of Medicine degree in the George Washington University School of Medicine and Health Sciences; (2) complete the general Columbian College course requirements; (3) earn 90 credit hours in the liberal arts, including a minimum of 30 in 100-level courses in Columbian College; (4) obtain the approval of the Dean of Columbian College at the time of entering the School of Medicine and Health Sciences; (5) obtain the recommendation of the Dean for Academic Affairs of the Medical Center at the completion of all prescribed courses in the first year of the Doctor of Medicine program, at which time the degree of Bachelor of Arts will be conferred (professional credit courses taken at another institution do not count toward the combined degrees); (6) maintain throughout the entire course the scholarship level required for graduation.

### **Second Bachelor's Degree**

Columbian College graduates who wish to receive a second bachelor's degree must satisfy the general College requirements and the requirements of their new major and degree and must complete 30 hours in residence in Columbian College. Students with undergraduate degrees from other institutions or from other divisions of the University, if admitted to the College, must meet the same set of requirements.

### **Placement, Waiver, and Credit Examinations**

#### **Preliminary Placement Examinations**

Many departments in Columbian College, including English, mathematics, and all foreign languages, require students to take placement tests to determine level of proficiency or eligibility for specified courses. The student is placed in an appropriate course on the basis of these tests. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

*English*—Students whose scores on either the Test of Standard Written English or on the English Composition Achievement Test suggest that they will benefit from more intensive training in compositional skills may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill



before placement in either Engl 9 or 10. Students whose scores indicate superior competence will be allowed to waive the Engl 10 requirement.

**English as a Foreign Language**—see Admissions.

**Foreign Languages**—A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination in one of the following: Chinese, French, German, Greek, Hebrew, Italian, Japanese, Korean, Latin, Portuguese, Russian, or Spanish. Upon completion of the examination, assignment is made to the appropriate course.

**Mathematics**—New students who wish to register in Math 30, 31, or 41 are required, prior to registration, to take a placement examination in algebra and trigonometry; those wishing to register in Math 51 are required, prior to registration, to take a placement examination in algebra.

### **Earning Credit by Examination**

Assuming there is no duplication of course work earned, a maximum of 30 credit hours of credit may be assigned for any combination of the following:

**College Board Advanced Placement Tests**—See Admissions. Credit may be granted for college-level courses taken in an approved secondary school if substantiated by satisfactory performance on the Advanced Placement Tests.

**College Board College-Level Examination Program (CLEP)**—See Admissions. Prior to matriculation, credit may be assigned for CLEP General Examinations passed at the 50th percentile or above. Credit may be assigned for any CLEP Subject Examinations passed at the level recommended in the College Board model policy. The General Examination in English composition and a few Subject Examinations are unacceptable for credit. After matriculation, credit for CLEP Subject Examinations will not be assigned without special authorization by the Columbian College department governing the subject involved.

**Special Departmental Examinations**—A student may request any department of Columbian College to offer a special examination covering the subject matter of any specific course. (If an appropriate CLEP Subject Examination is available, the department may choose to employ it.) The student must offer evidence of sufficient background to have a reasonable command of the subject matter. Departments reserve the right to deny such requests. Credit by special departmental examination is not permitted for the first two years of college-level courses in a native language other than English. A student who has previously taken examinations to waive course requirements may not subsequently take examinations for credit in the same courses. Assigning credit (or waiving a requirement) by special departmental examinations will depend on the department's evaluation of the examination paper. These examinations will normally be of at least three hours' duration. A fee for each course examination is charged for preparation, administration, and grading of the examination.

### **Waiving Introductory Courses by Examination**

Several departments in Columbian College, including English, history, and sociology, offer periodic waiver examinations for introductory courses. Such examinations may be attempted at the option of the student; a fee is charged. Specific departments should be consulted for further details. Passing a waiver examination does not entitle a student to any credit toward the degree.

### **General Curriculum Requirements**

All candidates for the degree of Bachelor of Arts or Bachelor of Science are admitted to a general arts and sciences curriculum until they declare a major field. Students should plan to satisfy most of their general curriculum require-

ments before they commit themselves to a specific major; most students select a major near the end of their sophomore year. General curriculum requirements are established by the College faculty as a whole and administered through its elected committees. Other curriculum requirements are administered by the major-field departments or programs. (Bachelor of Music candidates are admitted directly into the departmental curriculum.)

Students are obliged to demonstrate, either by course work or through examination, that they have attained an acceptable level of cultural literacy and intellectual competence and that they have acquired familiarity with the breadth and diversity of liberal learning.

Students must satisfy these requirements in eight distinct areas and should begin to do so in their first semester, because these fundamental competences and areas of knowledge often form a basis for future course work. No course may be taken to fulfill requirements in more than one of the eight categories, even though some courses may be listed in more than one category. Students may satisfy all or part of a specific requirement either through course work or by examination.

The eight categories of general curriculum requirements are listed below, along with specifically approved courses. Additional courses beyond those listed in each category may be authorized from time to time by the Curriculum Committee. Please consult the Office of the Dean, Student Services, for a supplemental list of appropriate courses prior to registration each semester. Unless otherwise specified, the indicated paired sequences of courses must be selected.

1. *Literacy*—6 hours: Engl 9 or 10, and 11 or 13. Unless waived, the first semester of English composition must be taken in the freshman year. The second semester (Engl 11 or 13) must be taken no later than the second semester of the sophomore year.

2. *Quantitative and/or Logical Reasoning*—6 hours chosen from one of the following combinations: Phil 45 and 121; Stat 51 or 53 or 91, and 105 or 129; Stat 111-12 or 129-30; Math 9 and 10, 12 and 13, 30 and 31, 30 and 41, or 51-52; Phil 45 and Math 120 or Stat 51 or 53 or 91; Honr 23-24.

3. *Conceptual Foundations and Development of Natural Science*—9 hours chosen from the courses listed below, distributed so that 3 or 6 hours come from Group A and 3 or 6 hours come from Group B (the 6-hour group must be a paired sequence): Group A: BiSc 3-4 or 11-12; Geol 1-2; Geol 5 and either 2 or 105. Group B: Chem 3-4 or 11-12 or 17-18; Honr 33-34; Phys 1-2 with 5-6; Phys 9-10; Phys 21-22 with 5-6.

4. *Social and Behavioral Sciences*—6 hours chosen from one of the following groups: two courses chosen from Anth 2, 3, and 4; Anth 2 and 150; Econ 11-12; Geog 1 and 2; Honr 43-44; PSc 1 and 2; PSc 3-4; Psyc 1 and 8; Soc 1 and 2.

5. *Creative and Performing Arts*—3 hours chosen from the following: Art 21, 23, or 41; Comm 171; Engl 81; Mus 3, 4, 8 or applied music courses in voice, a single instrument, or jazz performance (Mus 11-50, 57-60, 153); Phil 162; TrDa 14, 45, 46, 50-65, or 130.

6. *Literature*—6 hours chosen from one of the following combinations: Chin 163-64; Chin 181-82; Clas 107 and 108; Engl 51-52; Engl 61-62; Engl 71-72; Fren 53 and 54; Ger 51-52; Ger 103-4; Ger 112 and 114; Honr 63-64; Japn 111-12; Rel 9-10; Slav 91-92; Span 53 and 54, 55 and 56. (Additionally, students may satisfy this requirement by completing 6 hours of course work at the 100-level in a single foreign literary tradition taught in the foreign language.)

7. *Western Society and Civilization*—6 hours chosen from one of the following combinations: AmCv 71-72; Art 31-32; Clas 71-72; Hist 39-40; Hist 71-72; Honr 71-72; Hmn 1-2, 4-5; Phil 51-52; Rel 1-2.

8. *Foreign Language or Culture*—either option A or option B as follows.

A. *Foreign Language*—A student must demonstrate competence beyond the elementary level in a language other than English taught at GW. A student offering for admission four acceptable high school units of a single foreign



language (that is, four years of study of that language) has satisfied this requirement. A student who wishes to continue the same language studied in high school **must take the language placement test.**

In order to satisfy this requirement, the student must demonstrate competence at the level of the following courses, by either course work or examination (courses in the Romance languages must be completed with a grade of C- or better): Chin 4 or 6; Clas 3 or 13 or 24; Fren 3; Ger 4 or 6; Ital 3; Japn 4; Kor 4; Port 3; Slav 4 or 6; Span 3.

The student should be aware that in many instances foreign languages are required for the major or recommended as preparation for advanced work. The student should consult the advisor so that foreign language may be included, as appropriate, in the student's program.

B. Foreign Culture—6 hours chosen from one of the seven categories listed below. Courses listed singly may be combined with other single courses within the same category. (1) *East Asia*—Art 120; Chin 161; Chin 163-64; Hist 196; Hmn 6; IAff 91; Japn 111-12; Rel 160. (2) *Middle East*—Anth 177; Geog 154; Hist 193; Hist 194; Rel 161. (3) *Latin America*—Anth 172; Geog 161; Hist 161; Hist 162; Hist 163; Hist 164; IAff 90; PSc 183. (4) *Africa*—Anth 178; Hist 116; IAff 93; PSc 180; PSc 181. (5) *Russia/Soviet Union*—Hist 145; Hist 146; Slav 71; Slav 91-92; Slav 161-62. (6) *South Asia*—Hmn 6; Rel 157; Rel 158; Rel 159. (7) *Western Europe*—Hist 131-32; Hist 136; Hist 141 and 142; PSc 130.

### The Major

In order to declare a major, all students must secure the advisor's signature on a proper form (obtainable in the Office of the Dean, Columbian College Student Services) and return the form to the Office of Columbian College. No student is considered to have a major until this process is completed. Thereafter, the student receives academic guidance from a faculty advisor in the major-field department.

In most cases, filing of the approved declaration form assures the student of admission to the major declared; however, if space, equipment, or other requirements compel a department or major program to limit the number of students in that major, admission to the major may be on a selective or space-available basis.

A change in degree candidacy within Columbian College (e.g., from Bachelor of Arts to Bachelor of Science) requires the permission of the Dean. The degree requirements effective at the time the change is approved must be met.

### Major Fields

All fields listed below may lead to the Bachelor of Arts degree; a Bachelor of Science degree may be elected in those fields indicated by an asterisk.

American Civilization  
 Anthropology  
 \*Applied Mathematics  
 Art History  
 Art History/Fine Arts  
 \*Biology  
 \*Chemistry  
 Chinese Language and Literature  
 Classical Archaeology and  
 Anthropology  
 Classical Archaeology and  
 Classics  
 Classical Humanities  
 \*Computer and Information  
 Systems  
 Criminal Justice  
 Dance

Early Modern European Studies  
 Economics  
 English  
 \*Environmental Studies  
 Fine Arts  
 French Language and Literature  
 Geography  
 \*Geology  
 Germanic Languages and  
 Literatures  
 History  
 Journalism  
 Judaic Studies  
 \*Mathematics  
 Music  
 Philosophy  
 \*Physics

Political Communication  
 Political Science  
 Program in the Liberal Arts  
 Psychology  
 Radio-Television  
 Religion  
 Russian Language and Literature  
 Sociology

Spanish-American Literature  
 Spanish Language and Literature  
 Speech Communication  
 Speech and Hearing Science  
 \*Statistics  
 \*Statistics (Computer Science option)  
 Theatre

### Scholarship Performance in the Major

Majors are defined in terms of credit hours, required courses, and the attainment of grades no lower than C - in the minimum required 100-level courses taken in the major field. If a student receives a grade of D in a 100-level course required in the major, the major department or program may permit the course to satisfy a curricular requirement even though it would not normally count toward the minimum number of hours required for the major. However, the department or program may instead require the student to repeat the course until a satisfactory grade (C - or better) is earned. (The department chair or program director must authorize such repetition in a memo to the Office of the Dean, Student Services, before the student may register a second time.) Once the student has completed the course with a satisfactory grade, credit hours earned the first time the course was taken will count toward the minimum number of hours required in the major. Credit earned for the repetition will not count toward the degree. The minimum specific requirements for majors are listed below the staff of instruction of the department concerned. The chair of the department, or designated departmental advisor, should be consulted before registration concerning the student's program of courses; and the entire program, including electives, must be approved by the department. The student is also expected to consult the chair or advisor in all matters affecting the program of studies, such as changes, substitutions, or withdrawals, and especially concerning the student's progress in a course.

Some majors require satisfactory completion of entry, proficiency, or concluding examinations in addition to courses.

### Double Majors

With the prior approval of the departments concerned, a student who completes the requirements of two major fields in Columbian College (for example, mathematics and physics, or English and French, or history and economics) may graduate with a double major. Such a student should consult with advisors in the two departments concerned and officially declare both majors on the appropriate form available in the dean's office. A major field in Columbian College cannot be combined with a major field offered by another degree-granting unit of the University. A student may pursue two majors at the same time, even though one is toward a B.A. and the other is toward a B.S.

### Interdisciplinary Programs

**Regular Interdisciplinary Programs**—Programs include American Civilization, Classical Archaeology and Anthropology, Classical Archaeology and Classics, Early Modern European Studies, Environmental Studies, Judaic Studies, and Political Communication.

**Special Interdisciplinary Programs**—A student who finds no existing major or program suited to individual educational goals may develop a special major program, in consultation with appropriate departmental advisors. Final approval of such a program rests with the Committee on Curriculum. Only programs with valid and clearly defined academic goals will be approved, and each shall be designated by a title suggested by the student to the Committee on



Curriculum for approval. At least 45 credit hours of the approved program must be completed in Columbian College. Because of their broad scope, such interdisciplinary majors may not be combined with a double major.

A student in an interdisciplinary program will be expected, during the second semester of the senior year, to take a comprehensive examination (either oral or written) in the interdisciplinary field, or to undertake a senior comprehensive thesis, at the discretion of the student's interdepartmental committee.

**Special Interdisciplinary Courses**—Under the supervision of the Committee on Curriculum, new courses combining the methods and insights of several disciplines will be offered each semester. Interested students should consult the current *Schedule of Classes*, where such courses are numbered in the 700s. A student wishing to use any of these courses to satisfy the general curriculum requirements should consult the sponsoring department.

**Program in the Liberal Arts**—Directed by the Curriculum Committee of Columbian College of Arts and Sciences, this program is designed to provide a general education in the liberal arts, with or without another major, as the student chooses. It offers opportunity for achieving a substantial acquaintance with each of the three divisions of knowledge through a selection of courses that cultivate a broad perspective in time and in national and/or cultural traditions. The committee appointed to advise students in the program consists of one representative each from the humanities, the social sciences, and the natural and mathematical sciences. For curriculum requirements, see Liberal Arts, under *Courses of Instruction*.

## Minors and Secondary Fields

### Minors

Students who wish to familiarize themselves with a field outside their major may graduate with a minor in addition to the major. Not all Columbian College departments offer undergraduate minors; the requirements prescribed by those that do are listed under the department involved. A student interested in a minor should consult faculty advisors in the department concerned and declare both major and minor programs on the appropriate form available in the dean's office.

At least one-half of the course work required for a minor must be done in residence. Grades of C- or better must be earned in second-group courses, including such courses transferred as advanced standing from another institution. Courses passed with a grade below C- may be used to fulfill a minor field curricular requirement but may not be counted toward the total number of credit hours required for the minor.

When taken by a student enrolled at the University in a school other than Columbian College, such minors are designated secondary fields. The same curricular and scholarship requirements apply to secondary fields as to minors. Minors are available in the following fields:

American Civilization  
Applied Ethics  
Archaeology  
Art History  
Art History/Fine Arts  
Biological Anthropology  
Biology  
Botany  
Chemistry  
Chinese Language and Literature  
Classical Humanities  
Computer and Information Systems  
Creative Writing

Cross-Cultural Communication  
Dance  
Dance Education  
Economics  
English  
Fine Arts  
French Language and Literature  
General Anthropology  
Geography  
Geology  
German  
History  
Japanese Language and Literature

Journalism  
Judaic Studies  
Linguistics  
Mathematics  
Music  
Philosophy  
Physics  
Political Science  
Psychology  
Religion

Russian Language and Literature  
Sociocultural Anthropology  
Sociology  
Spanish Language and Literature  
Speech Communication  
Speech and Hearing  
Statistics  
Theater  
Women's Studies  
Zoology

### Secondary Fields

Just as students enrolled at the University but outside the College may pursue College minors as secondary fields, such study is permitted College students in other schools of the University. Secondary fields are available in the School of Education and Human Development in early childhood education, exercise and sport, human services, secondary education (preparation for certification), special education, and tourism studies; in the School of Engineering and Applied Science in computer science, electrical engineering, engineering analysis, operations research, and engineering management; in the School of Business and Public Management, in business administration; and in the Elliott School of International Affairs, in international affairs. Interested students should consult with their academic advisors.

Columbian College students are limited in the number of hours they may take in courses outside the College (so-called "professional credit" courses). Refer to the paragraph below.

### Other Academic Regulations

#### Courses Outside Columbian College

Courses in schools of the University other than Columbian College may be taken to fulfill curriculum requirements, with approval of the major department, subject to Columbian College rules governing allowable hours of professional credit.

Except for students in Naval Reserve Officers Training Corps programs, no more than 9 credit hours of courses offered by the professional schools of the University may count toward bachelor's degrees in Columbian College. (No credit is allowed toward the degree for exercise and sport activities courses.) Students who have extraordinary reasons for exceeding the 9-hour limit must receive prior approval from the dean. In the case of those pursuing a secondary field, there is an 18-hour limit, and prior approval of the dean is not required.

No more than 45 credit hours of courses completed by a student while in nondegree status in the Division of Continuing Education may be applied toward a degree in Columbian College.

**Naval Science**—For information on naval science courses and the Naval Reserve Officers Training Corps, see Naval Science, under Courses of Instruction.

#### Service-Learning Program

A maximum of 15 credit hours in Service-Learning Program courses may be credited toward bachelor's degrees in Columbian College.

#### Earning an Additional Hour of Credit

Normally, no deviation is permitted from the number of hours of credit given in parentheses after the title of each course. In exceptional circumstances, however, and with the prior approval in writing of the instructor and the dean, a student may register for and earn an additional hour of credit in certain



appropriate second-group (upper-division) courses within the College by doing a significant amount of extra work as assigned and supervised by the instructor.

### **Pass/No Pass Option**

A junior or senior student in Columbian College who is in good standing may, with the approval of the advisor and the dean, take one course a semester and receive a grade of P, Pass, or NP, No Pass. No student will be allowed to take more than four pass/no pass courses under this regulation. The student may, however, also receive grades of P/NP in proseminars for certain majors and in other courses normally using such grades. A student must sign up for the pass no pass option at registration. Under no circumstances may a student change from pass no pass status to graded status, or vice versa, after the end of the drop period or the eighth week of class. Courses required for the College's general curriculum requirements or in the student's major or minor field (including those courses required for the major that are offered by other departments) may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in this University.

### **Tutorial Study**

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a regularly listed course, may be permitted to take tutorial study in residence under the personal direction of the instructor, in accordance with the rules of the appropriate department and with the approval of the dean. Credit under this plan is limited to the specific credit hours of credit designated for each course in the list of courses of instruction. It assumes frequent and regular conferences between the student and instructor.

### **Premedical Curriculum**

A premedical student who intends to work toward a bachelor's degree fulfills the general requirements of Columbian College stated above and may follow the major-field curricula of any Columbian College department. Each premedical program must be approved by the premedical advisor. For admission to most medical schools, the student must have a minimum of 90 credit hours applicable toward a degree in an approved college of arts and sciences; the 90 hours must include

**Biology**—8 credit hours, including laboratory. This may be either in general biology or zoology but may not include separately credited courses in botany.

**Chemistry**—8 credit hours of general inorganic chemistry (which may include qualitative analysis), including laboratory, and 6–8 credit hours of organic chemistry, including laboratory

**Physics**—8 credit hours, including laboratory

**English**—6 credit hours. This may be the usual introductory English composition course or its equivalent.

Many medical schools have additional entrance requirements, among which are courses in biochemistry, embryology, histology, genetics, and mathematics. Even when such courses are not actually required, they are strongly recommended. With the exception of these specific requirements, applicants are urged to follow their personal interests in developing their premedical courses of study. A well-balanced program, rather than a specific field, is the criterion by which an applicant is judged. It is not advisable to take courses that appear to cover subject matter in the medical program. Although well-qualified candidates are eligible for admission after completing the minimum 90-credit-hour requirement, the majority of applicants are found to be better prepared for the study of medicine after four years of college work.

### Preparation for Law School

A broad liberal education is the best undergraduate preparation for law school. Columbian College, therefore, does not prescribe a prelegal curriculum. However, through its Office of Student Services, Columbian College provides students with advice about academic preparation for law school.

## SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Acting Dean D. Gross

Associate Dean J.E. Feir

### Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering. The organization and offerings of the school have changed several times over the years, but throughout most of its history the program has been characterized by its emphasis on principles rather than technology.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; Operations Research—the School of Engineering and Applied Science offers undergraduate study leading to the degrees of Bachelor of Science (Civil Engineering), Bachelor of Science (Computer Engineering), Bachelor of Science (Computer Science), Bachelor of Science (Electrical Engineering), Bachelor of Science (Mechanical Engineering), and Bachelor of Science (Systems Analysis and Engineering). The School offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist.

The School of Engineering and Applied Science maintains extensive and varied computing facilities as well as an array of laboratory facilities to support study and research in such areas as general-purpose electronics, computer science, graphics, computer-aided design, robotics and computer-aided manufacturing, computer-aided engineering, artificial intelligence/software engineering, decision support systems, human factors, communications research, power systems, control systems, medical engineering, combustion diagnostics, fluid mechanics and hydraulics, environmental engineering, propulsion, soil mechanics, thermal sciences and instrumentation, thin-film development, and communications, microwaves, and lasers.

### Entrance Requirements

#### Entering Freshmen

Consideration for admission is based on the following: (1) an acceptable certificate of graduation from an accredited high school showing at least 16 units (a unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work); (2) scores on the College Board Scholastic Aptitude Test (SAT) or on the American College Testing (ACT) battery; (3) high school grades; (4) class standing. Although no minimum scores are prescribed, test results are consid-



ered in determining admission eligibility. Students whose combined SAT scores are below 1100 (600 mathematics) or whose ACT composite scores are below 27 (28 mathematics) must show superior academic performance in their high school programs in order to be accepted for admission. In addition, although College Board Achievement Tests in English composition and mathematics are not required for admission to the School of Engineering and Applied Science, it is recommended that applicants submit scores on these tests.

Twelve of the 16 units required for admission must be distributed as follows: four in English; four in mathematics, including two in algebra, one in plane geometry, one-half in trigonometry, and one-half in precalculus, analytical geometry, or functions; one in physics; one in chemistry; and two in history or a foreign language. General science courses do not satisfy the science requirement but may be counted as elective units.

Applicants who do not meet the above requirements may be considered by the School, but additional mathematics or English placement tests may be prescribed.

A graduate of an approved high school who lacks not more than two units (only one of which may be a mathematics or science requirement) of the required subjects and who presents 16 acceptable units may be admitted to a prescribed program that includes courses to make up the deficiencies.

### **Transfer Students**

To be considered for admission as a transfer student, an applicant must be in good standing as to scholarship and conduct at all postsecondary institutions previously attended and should have a minimum grade-point average of 2.7 on a 4.0 scale. A student who has been academically dismissed will not normally be considered for admission.

When no duplication is involved, either through course work or examination, transfer credit may be granted for work successfully completed at other accredited institutions of higher learning. Credit will be granted only when such work meets the requirements for the degree sought at this University. Courses graded D, or the equivalent, or lower will not be considered for transfer.

Although there is no strict limit to the total amount of transfer credit that may be assigned, a student must satisfy the residence and course requirements for the degree sought at George Washington University. Students should complete a Transfer of Credit worksheet, available in the SEAS Admissions and Registration Office, and present the worksheet to their advisor for final approval.

### **Admission with Advanced Standing**

#### **Credit by Examination**

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following.

*College Board Advanced Placement (AP) Tests*—See Admissions.

*College Board College-Level Examination Program (CLEP)*—See Admissions.

A student already registered at the University must seek departmental approval before taking a CLEP Subject Examination for credit. Credit may not be earned by passing the examination after having taken the equivalent course or after having taken a waiver examination for the course.

*Department Examinations for Waiver or Credit*—Registered SEAS students may also take examinations in some academic departments for waiver of or credit for a specific course upon approval of the appropriate department chair; before the test is administered, the student must have demonstrated sufficient preparation to warrant being given the test. An examination for credit is not allowed if an examination for waiver has been successfully completed or if the student has

taken the course. The Department of Electrical Engineering and Computer Science does not offer these examinations.

### **Makeup of Credit for Waived Courses**

If a course required by the engineering curriculum is waived, the corresponding credit hours must be earned by satisfactory completion of a university-level academic course, either technical or nontechnical, approved by the student's faculty advisor or department chair. If the substituted course would normally be considered part of the engineering curriculum, the grade earned will be used in determining grade-point average, Dean's List, probation, and suspension. If the substituted course is not part of the engineering curriculum, the grade will not be included in the above computations.

### **Credit from Service Schools**

A limited amount of credit may be assigned for selected service school courses.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **Attendance**

Students may not attend classes until registration is completed and fees due are paid or appropriate arrangements are made with the Office of Student Accounts. Students are expected to attend all meetings of the courses in which they are registered, fully prepared to carry on the work required. Students are held responsible for all work in their courses, including work missed because of absence. Excuses for absences from examinations that have been announced in advance can be obtained only by written application to the instructor in charge of the course.

### **Academic Work Load**

A full-time undergraduate student who is not on probation may register for no more than 21 credit hours. Students on probation may not register for more than 12 credit hours. A student employed more than 24 hours a week may take no more than 10 credit hours. In exceptional cases these limits may be exceeded with the advisor's permission.

### **Changes in Program of Study**

A student may not make any changes in an approved program of study without the consent of the faculty advisor, instructor, international student services advisor (when appropriate), and the associate dean. Requests for changes in class registration must be made on a program adjustment form, available in the SEAS Admissions and Registration Office.

**Adding Courses**—During the first 14 days of the semester, courses may be added to the student's program by submitting a program adjustment form with the necessary signatures.

**Dropping Courses**—Courses may be dropped without academic penalty during the first 28 days of the semester by submitting a program adjustment form with the necessary signatures.

**Late Drop**—Permission to drop a course without academic penalty after the 28th day of a semester may be granted with the approval of the instructor, the student's advisor, the chair of the department in which the student is enrolled, and the associate dean. Requests for late drops must be submitted to the associate dean's office on the appropriate late-drop form and must be accompanied by a program adjustment form and certification of sickness or injury, if such is the



cause of the late withdrawal. A late drop may be granted only under both of the following conditions: (1) it is necessary because of exceptional circumstances, such as certified medical absence or forced absence caused by work-related requirements; (2) the grades in all courses involved are *D* or better as of the date of the request.

In all cases, financial regulations governing withdrawal remain in full effect.

**Change in Course Status**—The status of a course may not be changed from credit to audit or vice versa after the 28th day of the semester.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the associate dean. The associate dean may assign supplementary work, without academic credit, varying with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the associate dean.

### **Scholarship Requirements**

To be eligible for graduation a student must have (1) a grade-point average of at least 2.2 for technical courses taken in the fifth through eighth semesters of the curriculum and (2) a 2.0 overall average for the engineering program taken at SEAS.

Grades discussed in the sections below include all grades earned at George Washington University and through the Consortium universities while the student is enrolled at GW. The grades considered are for academic courses taken in fulfillment of degree requirements and as prerequisites for degree requirements, and not for remedial courses or those taken to make up deficiencies. (For example, EFL courses numbered 45 and below will not be considered for purposes of probation, suspension, or Dean's List.)

Social science, humanities, or technical elective courses taken in excess of the number needed to fulfill the requirements in these areas (including graduate-level courses) are not considered in determining probation, suspension, graduation, or Dean's List status. Only those courses initially taken to meet the requirements will be included in these determinations.

### **Probation**

A full-time student will be placed on probation if his or her grade-point average is less than 2.0 for one semester or if he or she receives more than one grade of *F* in one semester or summer session. A part-time student will be placed on probation if his or her grade-point average is less than 2.0 or he or she has received more than one grade of *F* when he or she has accumulated 12 credit hours. For academic purposes, a new grading period will begin once this accumulation is reached.

A student on probation who receives a grade-point average of 2.0 or better (for 12 or more credit hours) during the semester on probation but also receives a grade of *F* will be placed on continued probation. Students in this category who receive two *F*s will be suspended.

A full-time student will be removed from probation when his or her engineering curriculum grade-point average is 2.0 or more with no grade of *F* during the semester on probation. A part-time student will be removed from probation when his or her engineering curriculum grade-point average is 2.0 or more and he or she receives no grade of *F* for the next 12 credit hours after being placed on probation.

### Suspension

The following cases constitute grounds for suspension: (1) receipt of two grades of F any time during a probation period (part-time students receiving two grades of F while on probation will be suspended at the time of receipt of the second of these grades); (2) placement on probation in two consecutive semesters (or the equivalent for part-time students); (3) receipt of four grades of F in any semester (or the equivalent for part-time students); (4) placement on probation for a third time, whether or not the probation periods are consecutive; (5) accumulation of a grade-point average of (a) 1.5 or less at the end of the sophomore year or upon completion of the 63rd credit in the student's curriculum, (b) 1.9 or less at the end of the junior year or upon completion of the 97th credit in the student's curriculum, or (c) less than 2.0 at any time during the senior year.

Department faculty may designate additional courses to be taken and grades to be received by students who fail to meet but come close to meeting the graduation requirements. Suspension may be held in abeyance until the conditions are or are not met.

Students admitted on probation will be suspended if they do not attain a minimum grade-point average of 2.0 during their first semester (12 or more credit hours) or if they receive more than one grade of F during the period.

Once suspended, a student may not have that suspension rescinded by a grade change at a later date. The student may, however, apply for readmission noting the grade change. Students who have been suspended may not apply for readmission until one year after the suspension. To be considered for readmission, a student must have undertaken academic work at another institution, primarily in mathematics, science, or engineering, during the year of suspension and earned a grade-point average of at least 2.7.

### Midsemester Warning

At the end of the seventh week of each semester, instructors are expected to report to the dean the name of any student whose scholarship is unsatisfactory. On receipt of a warning notice, a student must consult with the appropriate instructor and faculty advisor immediately. The advisor may prescribe diagnostic tests or remedial study, or both, to be completed before the end of the semester.

### Dean's Honors and Commendation Lists

The names of all students who, in a given semester, take 13 or more graded credit hours in course work that applies to graduation requirements may appear on the Dean's Honor List if a grade-point average of 3.5 is achieved or on the Dean's Commendation List if a grade-point average of 3.0 is achieved. No disciplinary action may have been taken against the student, and no more than one grade of C and no grades below C may have been earned.

The grades used to compute the grade-point average that determines eligibility for the Dean's Honors and Commendation Lists are those used to meet the SEAS graduation requirements. A student who receives a grade of I (Incomplete) during a semester will not be placed on the Dean's Honors or Commendation List for that semester unless the I is removed no later than 30 days after the end of the marking period and the student continues to meet all the requirements for the Dean's Honors or Commendation List.

### Incompletes

Conditions under which the grade of I (Incomplete) may be assigned are described under University Regulations. If a grade of I is not changed to a letter grade of A, B, C, D, F, or Z within 30 days, decisions on probation, removal from probation, and suspension will be made with the information on hand, in conformance with SEAS regulations.



Although the grade of *I* may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of *I* cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. A grade of *I* that is not removed after one calendar year will be changed on the permanent record to a grade of *F*. A course in which a student receives an *F* in this way must normally be repeated. The grade to which the *I* is changed will be applied to the grade report for the semester or summer session during which the change is made for the purposes of determining probation, suspension, grade-point average, and Dean's and other honor lists.

### **Pass/No Pass Grading System**

SEAS students may not take courses required for graduation on the pass/no pass (P/NP) grading system. They may, however, take courses outside their regular engineering academic program under this grading system.

Students whose status of probation or suspension depends on a grade of *P* are given 30 days to have the grade changed. If not changed by the end of that period, the *P* will be considered a *C* for probation, suspension, Dean's List, and graduation purposes, and a grade of *NP* will be considered an *F*.

### **General Curriculum Requirements**

Bachelor of Science degrees are offered in civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. A minimum of 132 credit hours is required to qualify for the degree, although some curricula require more. Full-time students normally complete their programs in four years. The core curriculum—the program of the first four semesters—is largely similar across curricula, providing the base of scientific principles and mathematical techniques necessary for the professional courses taken in the last four semesters.

### **Advisory System**

Every entering undergraduate student is assigned a faculty advisor to assist in orientation in the professional discipline. Faculty advisors counsel students on their programs of study, achievement and maintenance of satisfactory scholastic performance, professional development, and extracurricular activity as part of the educational process. The advisor represents the student in all cases requiring faculty action.

Students must obtain their advisors' approval of programs of study prior to registration for each academic semester and summer session. Until the work required for the degree is completed, students must consult with their advisors in all academic matters. However, an advisor may not deny entry into any course or activity to which the student is entitled under the regulations of the School.

### **Courses in the Humanities and Social Sciences**

With the assistance of his or her advisor, each engineering student prepares a program of elective courses in the humanities and social sciences. The program must include a minimum of 18 credit hours, divided equally between the two disciplines. Further, each 9-hour group must include 6 hours, or a two-course sequence, in one subject area. The advisor and the department chair must approve the program.

Since the engineering curricula are, by necessity, oriented toward technical subjects, the program in the humanities and social sciences should consist of courses that broaden the student's outlook. Courses in areas such as anthropol-

ogy, economics, foreign languages, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

### **Civil Engineering**

Civil engineering encompasses those branches of engineering most closely related to the control and improvement of our environment and of the physical conditions of life. Civil engineers apply many technical specialities in order to plan, design, and construct projects that range from buildings and transportation systems to space stations and space habitats.

#### **Core Curriculum**

*First Semester*—CSci 50; Engl 9 or 10; Math 31; Phys 13; humanities or social science elective.

*Second Semester*—Chem 13; EngS 4; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 57, 113, 115; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 58, 114; CE 120, 140; Phys 16; humanities or social sciences elective.

#### **Civil Engineering Curriculum**

*Fifth Semester*—CE 117, 121, 166, 167; ME 126, 131.

*Sixth Semester*—CE 122, 192, 193; Geol 136; humanities or social sciences electives (6 hours).

*Seventh Semester*—CE 168, 190, 191, 194, 195; technical elective selected from list below.

*Eighth Semester*—CE 182, 185, 196, 197; technical electives (8 hours); EMgt 160 is strongly recommended.

**Technical Electives**—ApSc 199; CE 198, 201, 202, 203, 204, 206, 208, 210, 212, 213, 214, 215, 216, 220, 222, 223, 240, 241, 243, 253, 255, 266, 282; EMgt 160; EngS 215, 231, 234, 237, 241, 242, 282, 284.

### **Computer Engineering**

Computer engineering combines electronic design, programming of computers, and mathematics. Students are prepared to design hardware and software for microcomputers and large-scale computing systems and to design computer hardware and software for control of large systems.

#### **Core Curriculum**

*First Semester*—CSci 51; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—CSci 53, 54, 120; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 113; CSci 131; EE 11; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 114; Chem 13; EE 20, 64; Phys 16; humanities or social sciences elective.

#### **Computer Engineering Curriculum**

*Fifth Semester*—CSci 133, 140; EE 12, 30, 66, 67, 122.

*Sixth Semester*—ApSc 115; CSci 142, 144, 162, 165, 166, 172.

*Seventh Semester*—CSci 163, 182; EE 126, 143, 172; humanities or social sciences elective.



*Eighth Semester*—CSci 156, 164, 167, 188; EE 128; humanities or social sciences elective.

### **Computer Science**

The program combines systems design, computer programming, and mathematics to provide a broad background in the disciplines that underlie computer science. Students are prepared to design and implement the software needed for large computing systems and small microprocessor-based systems. Application tracks allow in-depth study of areas in which computers are used.

#### **Core Curriculum**

*First Semester*—CSci 51; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—CSci 53, 54, 120; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 113; CSci 131, 133; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 115; Chem 13; CSci 142, 144; humanities or social sciences elective.

#### **Computer Science Curriculum**

*Fifth Semester*—CSci 140, 145, 148, 155; Engl 110; elective selected from chosen application track (see list below).

*Sixth Semester*—CSci 146, 156, 168, 172; application elective; humanities or social sciences elective; nontechnical elective.

*Seventh Semester*—CSci 163, 175, 182, 185; application elective; nontechnical elective.

*Eighth Semester*—CSci 164, 174, 178; application elective; humanities or social sciences elective; nontechnical elective.

Note: Students admitted to the Honors Research Program may substitute ApSc 199 for one 3-credit elective course.

#### **Application Tracks**

A student must choose an application track from those listed below and complete 12 credit hours in the track selected.

**Computer-Aided Design**—EngS 282, 283, 284, 285.

**Digital Electronics and Hardware**—EE 11 (required in fifth semester), 20 (sixth semester), 122 (seventh semester); CSci 188 (eighth semester).

**Engineering Management**—EMgt 150, 160, 170, 211.

**Financial Systems**—Accy 51, 52; Fina 120, 123.

**Management Decision Systems**—MLOM 140, 183, 188; SMPP 191.

**Management Information Systems**—Mgt 107, 120, 121, 122.

**Mathematics**—ApSc 114; Math 101, 113, 121, 122, 123.

**Operations Research**—OR 101, 102, 151, 190.

### **Electrical Engineering**

Electrical engineering is concerned with the generation, transmission, control, and utilization of electricity. Electrical engineers design generators, electronic circuits, transmission networks, and voice, data, and video communications systems. They harness electromagnetic radiation and develop instrumentation to assist the medical profession in diagnosing and treating disease.

### Core Curriculum

**First Semester**—CSci 50; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective (except for students selecting the pre-med option, who take BiSc 11 instead).

**Second Semester**—Chem 13; CSci 53, 57; Math 32; Phys 14; humanities or social sciences elective (students in pre-med option take BiSc 12 instead).

**Third Semester**—ApSc 57, 113; EE 11; Math 33; Phys 15; humanities or social sciences elective (students in pre-med option take Chem 22 instead).

**Fourth Semester**—ApSc 58, 114; EE 20, 64; Phys 16; humanities or social sciences elective (students in pre-med option take Chem 23 instead).

### Electrical Engineering Curriculum

**Fifth Semester**—CSci 140; EE 12, 31, 66, 67, 122; humanities or social sciences elective.

**Sixth Semester**—ApSc 115; EE 32, 121, 169, 177; technical elective selected from list below.

**Seventh Semester**—EE 143, 163, 172; technical elective; laboratory elective selected from list below; humanities or social sciences elective.

**Eighth Semester**—EE 144, 164; technical electives (6 hours); laboratory elective; nontechnical elective.

**Technical Electives**—CE 140; CSci 120, 162, 172, 182; EE 113, 116, 124, 126, 127, 128, 133, 134, 160, 178, 184, 192. Students may also elect appropriate graduate courses with the permission of their advisors.

**Laboratory Electives**—EE 146, 147, 166, 167, 168, 171, 176, 186, 196.

### Premedical Engineering Option

The premedical engineering option permits the student to obtain a bachelor's degree in engineering and have sufficient preparation to apply to a medical school for study toward the Doctor of Medicine degree. The student is also prepared to work in various health sciences fields and in the research and development of electronic equipment used in medicine or to continue as a graduate student in engineering with exceptional qualifications for medical engineering.

**Fifth Semester**—Chem 151, 153; CSci 140; EE 12, 31, 66, 67, 122.

**Sixth Semester**—ApSc 115; Chem 152, 154; EE 32, 121, 169; humanities or social sciences elective.

**Seventh Semester**—EE 143, 163, 172; laboratory elective selected from EE 146, 147, 166, 167, 168, 171, 176; humanities or social sciences electives (6 hours).

**Eighth Semester**—EE 164, 184, 186, 192, 196; humanities or social sciences electives (6 hours).

### Mechanical Engineering

Mechanical engineering is primarily concerned with physical systems in motion—with the conversion, transfer, and control of energy from its source to its moving system. Mechanical engineers may be involved in work with transportation systems, nuclear reactors and fuel cells, pollution-control devices, and practical means of converting various forms of energy to mechanical and electrical power.

**Junior Year Abroad Program**—The School of Engineering and Applied Science and the Institute of Sound and Vibration Research of the University of Southampton, England, have established an exchange program that enables some mechanical engineering students to spend the junior year abroad. Students must apply for admission to the Junior Year Abroad Program to the department chair before the end of the fall semester of the sophomore year.



**Core Curriculum**

*First Semester*—CSci 50; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—Chem 13; EngS 4; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 57, 113, 115; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 58, 114; CE 140; EE 11; Phys 16; humanities or social sciences elective.

**Mechanical Engineering Curriculum**

*Fifth Semester*—CE 120, 166, 167; ME 117, 126, 131.

*Sixth Semester*—EE 20; ME 120, 134, 187, 191; humanities or social sciences elective.

*Seventh Semester*—ME 149, 182, 190, 192, 193; design elective selected from EngS 282 or ME 243, 259, or 291.

*Eighth Semester*—ME 152, 189, 195, 196; technical electives (6 hours) selected from chosen subject area; humanities or social sciences elective.

**Subject Areas**

**Computer-Aided Design**—ME 197 (required); ApSc 199; CSci 120, 140, 144, 157; EngS 282, 283, 284, 285; ME 198, 241, 251.

**Energy and Power**—ME 155 (required); ApSc 199; EngS 208; ME 198, 257, 258, 259, 260, 291, 292.

**Fluid Mechanics and Thermal Sciences**—ME 155 (required); ApSc 199; EngS 218; ME 198, 221, 231, 237, 280, 288, 289.

**Mechanical Engineering Design**—ME 197 (required); ApSc 199; EngS 215, 257, 284, 285; ME 198, 240, 241, 242, 243, 251.

**Solid Mechanics and Materials Engineering**—EngS 218 (required); ApSc 199; EngS 215, 221, 231, 233, 234, 237, 241, 285; ME 198; Phys 170.

**Systems Analysis and Engineering**

In systems analysis and engineering, scientific methods and engineering techniques are applied to the solution of management problems, particularly those concerning the most efficient and effective use of resources. Practitioners seek to observe, understand, and predict the behavior of human-machine systems so that the best decisions about these systems can be made.

Graduates of the systems analysis and engineering program are given 2 credit hours of advanced standing applicable to the master's program in operations research at GW.

**Core Curriculum**

*First Semester*—CSci 51; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—Chem 13; CSci 53; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 57, 113; CSci 133; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 58, 114, 115; CSci 120; EMgt 160; humanities or social sciences elective.

**Systems Analysis and Engineering Curriculum**

*Fifth Semester*—ApSc 116; CSci 131; OR 101, 109; Stat 187; humanities or social sciences elective.

*Sixth Semester*—CSci 144; Engl 110; OR 102; Stat 118; elective selected from chosen track (see below); humanities or social sciences elective.

*Seventh Semester*—CSci 155; OR 135, 190; Stat 181; elective selected from chosen track.

*Eighth Semester*—OR 151, 173, 191; two electives selected from chosen track.

### **Elective Tracks**

Each systems analysis and engineering major must take four courses in one of the following elective tracks.

**Computer Systems**—CSci 142, 148, 156, 174, 175, 178.

**Control and Instrumentation Systems**—EE 11, 12, 172, 184.

**Economic Systems**—Econ 101, 102, 121, and another course selected from 100-level offerings in economics, with approval of advisor.

**Electrical Energy Systems**—EE 11, 12, 31, 177.

**Electromechanical Systems**—ME 117, 126, 134, 182.

**Environmental Systems**—CE 193, 194, 197; ME 126.

**Financial Systems**—Accy 51, 52; Fina 120, 123.

**Management Decision Systems**—MLOM 140, 183, 188; SMPP 191; CSci 178.

**Mathematical Systems**—Math 101, 103, 113, 121, 122, 139, 140, 157.

**Mechanical Energy Systems**—CE 140; ME 126, 131, 194.

**Naval Systems**—NSc 150, 151, 175, 176.

**Network Systems**—EE 11, 12, 20, 113.

**Production Systems**—MLOM 188; SMPP 191; ME 190, 192.

**Statistical Systems**—OR 216; Stat 119, 123, 183, 188.

### **Honors Research Program**

To provide individualized research experience to academically gifted students, the School has established an Honors Research Program. A student who maintains a grade-point average of 3.3 or above or is admitted to the School with a combined SAT score of 1250 and a rank in the upper 10 percent of his or her high school class is eligible for this program. Participants attend an honors research seminar and each works individually with a faculty member, performing a research project of mutual interest. Students participating in the program earn 3 credits per semester; a minimum of 9 credits is needed to complete the program. Upon written request by the student, 6 of these credits may be used as technical electives. Qualified students interested in applying for the program should contact the honors research chairman of the department in which the research is to be conducted.

### **Secondary Fields of Study**

The School of Engineering and Applied Science offers secondary fields of study in computer science, electrical engineering, engineering analysis, operations research, and engineering management to students in other schools of the University.

SEAS students are cautioned to consult their advisor and department chair before enrolling in a secondary field of study in another school of the University.

### **3:2 Dual-Degree Programs Combining Liberal Arts and Engineering**

The School of Engineering and Applied Science has developed 3:2 dual-degree programs in liberal arts and engineering with the following accredited institutions: Bowie State College, Chestnut Hill College, Gallaudet University, Georgian Court College, Hood College, Mansfield State University, St. Joseph College, St. Mary's College of Maryland, St. Thomas Aquinas College, Southeastern College (Athens, Greece), Virginia Commonwealth University, and Wheaton College.



Students initially enroll in the 3:2 dual-degree program at one of the above institutions and pursue a three-year course of studies covering social sciences, humanities, mathematics, physics, and chemistry, which helps the student develop broad cultural perspectives, analytic abilities, and communication skills. Students then follow a two-year career program in engineering at the School of Engineering and Applied Science. During this phase of study, students may specialize in any of the areas of engineering offered in the School's regular four-year programs. Upon successful completion of the two-year engineering program at George Washington University, students are awarded two baccalaureate degrees: a B.S. or B.A. from the first institution and a B.S. in engineering or computer science from GW.

For further information on the 3:2 dual-degree programs, contact the admissions offices of the institutions listed above.



## SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

Dean L.D. Leonard

Associate Dean J.R. Shotel

Assistant Dean J.C. Heddesheimer

### Introduction

The University began offering professional courses for teachers in 1904-5, and in 1907 it established a Division of Education. In 1909 the Division of Education became the Teachers College, which in its early years was concerned largely with teacher preparation on the undergraduate level.

In 1928 the Teachers College became the School of Education and greater provision was made for advanced study. Since that time the School has continued to grow; it now comprises a broad range of graduate and undergraduate programs. To reflect the current scope of its offerings, the name of the School was changed in 1978 to the School of Education and Human Development.

The School of Education and Human Development prepares teachers, human service and service industry personnel, resource and support personnel, and administrators for professional service. The School also offers opportunities to experienced professionals to extend and enrich their education. The programs are designed to meet the broad needs of persons who seek knowledge and skills necessary to provide effective learning and teaching, research, services, and leadership in a variety of settings. The School's programs address the preparation of individuals for all areas of education and human development, covering the life span from pre-school through the adult years, in both the public and private sectors of society.

Programs provide opportunities for students to develop a foundation in the liberal arts, critical thinking and reasoning, as well as leadership, organizational, and planning skills. Emphasis is placed upon developing the human relationship qualities that are essential in fields that require involvement with people in all age ranges and from all walks of life.

The School of Education and Human Development is the administrative unit for four departments: Educational Leadership, Human Services, Human Kinetics and Leisure Studies, and Teacher Preparation and Special Education. In addition to programs of study leading to its degrees, the School offers credit and noncredit

workshops designed specifically to meet the unique needs of metropolitan area school systems and other clientele in private industry and government.

Special curricula are tailored on an individual basis for liberal arts graduates and graduates of other professional schools who are interested in teaching or in other human services areas. The School also offers a wide range of courses for teachers who wish to renew licenses and for provisional teachers who wish to prepare for teaching certificates.

Laboratory and clinical facilities are provided by the University Reading Center and the Counseling Laboratory. Field experiences are provided in cooperation with public and private schools, social and health agencies, museums, institutions in the business community, and community and junior colleges.

### **Education for Careers in Teaching**

Programs of study for teaching careers are based upon the assumption that every teacher should have a broad general education, mastery of specialty studies related to the content of instruction, and professional knowledge and competencies. The relative emphasis placed upon each of these aspects of the total education for teaching varies in accordance with the purposes of each program.

The student may choose any one of the following plans to achieve superior educational preparation for teaching or for other education-related fields:

1. Upon receiving the Bachelor of Arts in Education and Human Development with a major in special education, he or she may take a teaching position and, after acquiring some professional experience, return to the School for graduate study leading to the master's degree. During the first year of teaching, in particular, graduates are encouraged to establish a close contact with the School of Education and Human Development, whose faculty will provide supportive assistance to beginning teacher graduates of the school. This plan enables students with bachelor's degrees to begin their teaching careers and to use their work experience to enhance graduate study that will follow.
2. The student may choose to pursue graduate study leading to the master's degree immediately after receiving the bachelor's degree.
3. A student whose bachelor's degree is in one of the liberal arts disciplines may choose to complete the teacher certification preparation program or one of the master's programs offered by the School.

### **Education for Careers in Human Services and Human Development**

Programs of study in human services and in exercise and sport science provide a strong liberal arts/general education component, specialty studies, professional studies, and supervised field experiences. Graduates are prepared to enter a specialty career field or continue with graduate studies. Master's degree programs offer advanced specialized studies in selected fields, and doctoral programs provide leadership, research, and advanced professional skills.

### **Professional Courses for Non-Education Majors**

Freshmen and sophomore students may take professional education courses that include field work experiences. Some of these courses make it possible for students who are undecided about their choice of a career to have an opportunity to test teaching and some of the many related human service areas.

Many education courses are open to non-education majors. It is recommended that students check with the appropriate departmental office for more specific information on courses that are open.

The School of Education and Human Development offers secondary fields of study in early childhood education, exercise and sport, human services, secondary education (certification), special education, and tourism studies. Specific



information is available in the brochure "Secondary Fields of Study" available in the office of the dean.

### Regulations

See Admissions; Fees and Financial Regulations; University Regulations.

### The Bachelor's Degrees

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Human Development (special education and human services) and Bachelor of Science in Human Kinetics and Leisure Studies (exercise and sport science).

### Entrance Requirements for Freshmen and Sophomores

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman and/or sophomore years are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college-preparatory mathematics.
2. The principal's statement that the applicant is prepared to undertake college work.
3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on the Scholastic Aptitude Test, or on the American College Testing battery.

It is recommended that the College Board examinations be taken in December or January of the senior year. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the tests, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

The School of Education and Human Development will consider the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not meet all of the formal requirements stated above. The School may require appropriate scholastic aptitude tests. Students admitted with deficiencies in secondary school units will be required to begin removing such deficiencies within the first year, by appropriate courses or examinations.

International students may be considered for admission with an equivalent foreign secondary certificate. A student presenting such a certificate must also show competence in the English language and may be required to enroll in a full-time program in English as a Foreign Language before beginning studies in a degree program. Requirements will be determined on the basis of an English Proficiency Test administered on campus. A candidate who submits a score of 580 or above on the Test of English as a Foreign Language (TOEFL) may be excused from taking further course work in English as a Foreign Language but will be required to take the English Placement Examination on campus.

Students who have been out of secondary school for three years or more or do not meet the above requirements may take a special battery of admission tests by contacting the Office of Admissions or may be considered for provisional admission to the School of Education and Human Development. A student admitted provisionally is required to complete a trial program of 15 credit hours of course work with a grade-point average of 2.5 or higher. The selection of courses to be taken in the trial program must be made in conference with a faculty advisor.

All undergraduates admitted directly to the School of Education and Human Development are assigned academic advisors at the time of admission. Advisors are designated to provide continuity of advising for students throughout their years of undergraduate study. The program for each student must be approved by a faculty advisor.

Special education students should be familiar with the certification requirements of those localities in which they expect to teach. Information on state licensing requirements is available in the Career and Cooperative Education Center.

### **Admission With Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows.

Students who have accumulated 15 hours or more of academic credit at another regionally accredited college or university with an acceptable program and acceptable grades may be admitted to the School of Education and Human Development as transfer students with advanced standing. Such transfer students must have a grade-point average of 2.5 or better for college course work and must meet freshman requirements. Advanced standing may be awarded for properly certified courses for which the student received a grade of C or better, provided that such courses are comparable to the curriculum requirements of the degree at GW. In the case of course work from a two-year college, no more than 60 to 63 credit hours of credit may be applied as advanced standing toward the total number of credit hours required for the bachelor's degree.

Although a grade of D in a course is not acceptable for transfer, the course may be used to satisfy a curriculum requirement. Credits earned with a D grade may not, however, be counted toward advanced standing.

The School reserves the right to refuse credit for transfer in whole or in part or to allow credit provisionally.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students may transfer from another division of this University into a degree program in the School of Education and Human Development. The student must present an accumulated grade-point average of 2.5 or higher at the time of transfer must submit a formal application of transfer to the Office of Admissions.

Students applying for transfer from another accredited college or university or from another division of this University, who do not meet the formal requirements for admission with advanced standing or whose previous academic records raise doubts of their ability to complete degree requirements successfully, may be provisionally admitted to the School of Education and Human Development. To be admitted into the School's degree program, a provisionally admitted student must complete a prescribed trial program of 15 credit hours of course work with a grade-point average of 2.5 or higher.

The selection of courses to be taken in the trial program must be made in conference with a faculty advisor. A conference concerning plans for study as a degree candidate is required of each applicant at the beginning and end of the



trial program. Upon successful completion of the trial program, the student who has submitted a degree-candidate application will be advanced to degree status.

Nurses filing for admission to the bachelor's program in human services are required to submit a copy of their current state nurse's registration (license) in addition to the official transcripts. Nurses may be awarded advanced standing for work completed in a community or junior college program. They may also receive advanced standing of up to 45 credit hours for course work completed as part of a three-year nursing diploma program in a teaching hospital. Graduates of associate's degree nursing programs may be awarded advanced standing of up to 63 credit hours.

### **General Scholarship Requirements**

Regulations regarding academic standing, probation, suspension, withdrawal, classification of students, required placement examinations, and waiving introductory courses by examination are the same as those for Columbian College; see Columbian College of Arts and Sciences.

### **Academic Work Load**

Fifteen to 17 credit hours constitute a normal program. A student with a grade-point average of 3.0 or higher may, with the permission of the dean, enroll for 18 or 19 hours. No student may enroll for more than 19 hours, except by permission of the dean. Check with the office of the dean for information on the number of hours a student may be employed in relation to the number of credits that may be taken.

### **Placement Examinations**

Many departments in Columbian College, including English, Mathematics, and all foreign languages, require students to take placement tests to determine level of proficiency or eligibility for specified courses. The student is placed in an appropriate course on the basis of these tests. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

### **Earning Credit by Examination**

Undergraduate students may earn credit up to a maximum of 30 hours by performing satisfactorily on College-Level Examination Program (CLEP) tests or special departmental examinations provided by the departments of Columbian College of Arts and Sciences on an individual basis. Passing a waiver examination does not entitle the student to any credit hours of credit in the School of Education and Human Development. A limited amount of credit may be assigned for selected service school instruction.

Students interested in becoming certified to teach who have earned bachelor's or graduate degrees in fields other than education may satisfy some certification requirements by taking the CLEP tests or special departmental examinations. See Admissions for general information on the CLEP tests and for information on special examinations offered by departments.

### **Requirements for the Degrees**

To be recommended for a degree, a student must satisfy the admission, residence, scholarship, and curriculum requirements. The amount of course work required for bachelor degrees is as follows:

*Bachelor of Arts in Education and Human Development*—special education and human services, 129 credit hours.

*Bachelor of Science in Human Kinetics and Leisure Studies*—exercise and sport science, 124 credit hours.

#### *Residence*

Candidates for the bachelor's degree must complete satisfactorily a minimum of 30 credit hours in the School of Education and Human Development.

#### *Dean's List*

To be eligible for the Dean's List a full-time student must obtain a grade-point average of 3.5 on courses completed during the past semester. A part-time student, to be eligible, must obtain a grade-point average of 3.5 on the last 12 credit hours of course work. Such part-time students must be in residence and must be continuously enrolled.

#### *Scholarship Requirements*

For the system of grading and of computing scholarship, see *Scholarship Requirements under University Regulations*.

A grade-point average of at least 2.5 is required before permission is granted to do student teaching in the senior year. In order to graduate, a student must have a grade-point average of at least 2.25.

*Probation*—A student who fails to maintain a grade-point average of at least 2.25 is placed on probation. The student remains on probation as long as the grade-point average is below 2.25 or until probation is removed by the Student Committee.

*Suspension*—A student on probation who fails to raise the grade-point average to 2.25 within the time specified may be suspended.

A student suspended for poor scholarship may, within 10 days, appeal the case through the dean to the Student Committee. If the case appears to be remediable and the student's scholarship seems likely to improve, the Committee may readmit the student on probation. A student denied readmission may again, after a lapse of a calendar year, petition the Committee through the dean for readmission. A student suspended twice will not be readmitted.

#### *Use of Correct English*

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the dean.

#### *Curriculum Requirements*

In all bachelor's curricula at least 60 credit hours must consist of courses numbered above 100 or the equivalent in transfer credits.

#### *Pass/No Pass Option*

A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course a semester and receive a grade of P (Pass) or NP (No Pass), which will be recorded on the student's transcript but will not be reflected in the student's grade-point average. No student will be allowed to take more than four pass/no pass courses. Students must sign up for such an option at registration. Students may change from pass/no pass status to graded status, or vice versa, after the end of registration only with the permission of the dean and the course instructor. Courses



required in the student's major field may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment at this University.

### **Incomplete/Authorized Withdrawal**

Conditions under which the grades of I (Incomplete) or W (Authorized Withdrawal) may be assigned are described under Regulations.

**Changing an Incomplete**—When a grade of I is assigned, the instructor should normally set a period within which the uncompleted work (usually the final examination or a required paper) must be made up. When required work has been completed, it is the responsibility of the instructor to change the grade of I as appropriate. If work is not completed, the instructor will decide whether to change the grade of I to F or to allow the I grade to remain. The grade of I cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

### **National Teacher Examination**

The National Teacher Examination is required for special education majors. Students who take the Examination receive individual reports of test scores and may avail themselves of the regular transcript services of the Educational Testing Service.

### **Bachelor of Arts in Education and Human Development Special Education Program**

The special education program leading to the degree of Bachelor of Arts in Education and Human Development is planned to provide a general education component, a strong academic background relevant to the teaching field, a mastery of professional knowledge and skills necessary for the beginning teacher, and development of attitudes needed for success in teaching.

#### **General Education**

The general education component is an integrated course of study that provides students appropriate depth and breadth in the liberal arts and sciences. The general education component provides theoretical and practical knowledge gained from studies in English, mathematics, sciences, history, literature, and the arts.

The following is the general education curriculum for the special education program. Certain introductory general education courses may be waived according to regulations explained elsewhere in this Bulletin, and higher-level courses may be substituted in the same field. Students should consult their advisors regarding waiving and substituting courses. Waiving a course does not allow a reduction in credit-hour requirements.

The following courses are required. Engl 9 or 10, 11, and 51-52 or 171-72; Math 9 and 10; 3 credit hours each in biological science, physical science, and geology; SpHr 11; HmKn 122.

#### **Preprofessional Studies**

Preprofessional studies consist of introductory education and human development courses that students take in their freshman and sophomore years. These studies introduce students to the broad field of education, provide basic knowledge about human development, and afford initial field experiences in educational and human development settings.

Preprofessional course requirements for special education are Educ 171; SpEd 57, 58; TrEd 105.

### *Specialty Studies*

The specialty studies provide special education students with a mastery of the structure, skills, concepts, ideas, values, and facts that constitute their field of specialization. It encompasses both concentrated study and knowledge of the methods of inquiry appropriate to the specialty area.

Specialty study course requirements are Psyc 101 and 3 credit hours each of U.S. history, geography, economics, art history, and music history.

### *Professional Education*

The basic professional information, skills, and attitudes needed by beginning teachers are provided through a sequence of courses to be taken throughout the four years of undergraduate study. Lectures and class discussions are closely coordinated with fieldwork. The prescribed courses in special methods are concerned primarily with methods of initiating, guiding, and evaluating learning experiences dealing with the content of teaching fields. They attempt to bring to the student specific suggestions drawn from the accumulated experience of successful teachers. In addition, the courses review the teaching-field content currently in use in schools.

The required courses are SpEd 102, 189, 170, 103, 190, 101, 199, 160, 168; Educ 112, 180; TrEd 110, 118, 128.

Second-semester sophomores must file an application for permission to complete the professional studies component in the junior and senior years. Applications may be obtained in the Office of the Dean or the Office of Laboratory Experiences. Academic advisors must recommend students for the professional studies component. A writing sample is required.

Students must be approved for student teaching prior to the eighth semester by their academic advisors. A grade-point average of 2.5 is required as well as a valid medical certificate indicating that the student has taken a T.B. test and is free of tuberculosis.

### **Bachelor of Arts in Education and Human Development Human Services Program**

The Human Services Program is designed for persons who are employed or wish to work in the following representative types of human service areas: hospitals and health care agencies, residential centers, cultural institutions, substance abuse rehabilitation programs, correctional institutions, and voluntary agencies.

The program includes a core of course work in the human services, fieldwork experiences in diverse human services settings, and academic concentration in selected academic departments of the University. Each program is individually planned after evaluation of the student's professional and educational background and long-range goals.

Students planning to major in human services take the following courses: Engl 9 or 10, 11, 51-52; Comm 1, 121; one course chosen from Math 9, 10, or 12 or Stat 51 or 53; BiSc 3-4 or an alternative approved science sequence; 27 credit hours of courses in the social sciences that have been approved by the advisor, including a course in professional ethics and at least 6 hours of history or political science and 9 hours of anthropology and/or sociology; 9 hours of electives. The core program consists of 39 credit hours, including Educ 104, 171, 172; HmSr 176, 182, 195; SLP 152; and 15 additional hours in the core program selected with approval of the advisor. The concentration consists of 24 credit hours and is selected from the following fields: rehabilitation services, special education, health services administration, human resource development, or a secondary field of study in an area such as psychology or sociology. In addition, students may select a minor in rehabilitation services, consisting of five core courses and a



subspeciality in developmental disabilities, client advocacy, or psychosocial disabilities.

#### **Bachelor of Science in Human Kinetics and Leisure Studies Exercise and Sport Science**

This program prepares students for careers in exercise physiology, coaching, athletic training, or sports management or for graduate study in physical therapy, sport psychology, or corporate fitness.

Students who plan to major in exercise and sport science take the following courses in the first two years of study: Engl 9 or 10 and 11; four courses selected from American civilization, anthropology, economics, geography, history, political science, psychology, or sociology; two courses selected from biological sciences, chemistry, geology, mathematics, or physics; Comm 1 or 111 or SpHr 11; HmKn 103, 109, 110, 111, 112, 130, 150, 151; four credit hours of ExSA courses; and three HmKn or other electives selected with the approval of the advisor. In the third and fourth years, the following courses are taken: two courses in English literature; Educ 180; HmKn 134, 138, 140, 146, 152, 158, 161-62, 171; and 24 credit hours of elective courses approved by the advisor.

#### **Teacher Certification Curricula**

The School of Education and Human Development provides individually planned programs for liberal arts graduates with appropriate degrees from accredited institutions who wish to prepare for teaching. Those seeking certification, but not wishing to work for a degree, may enroll in a certification preparation program if they meet the admission and scholarship requirements of degree candidates. The School also provides a wide range of courses of interest to teachers who wish to renew licenses.

## SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT

Dean B. Burdetsky

Senior Associate Dean M.M. Harmon

Associate Deans L. Graff, R.F. Dyer

### Introduction

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the professional development of individuals assuming membership and leadership roles in society. The School comprises nine departments—Accountancy; Finance; Health Services Management and Policy; International Business; Management Science; Marketing, Logistics, and Operations Management; Public Administration; Strategic Management and Public Policy; and Urban Planning and Real Estate Development. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

The School of Business and Public Management is a member of the Middle Atlantic Association of Colleges of Business Administration and the American Assembly of Collegiate Schools of Business, and its Bachelor of Business Administration program is accredited by the Assembly.

### Purposes

The School of Business and Public Management is dedicated to academic excellence through the study, teaching, and research of management and policy in the public and private sectors, both within the United States and internationally.

Because of the growing interdependence of government and business, the School of Business and Public Management practices a multidisciplinary approach with flexibility in educational programming in the belief that such is essential to dealing with the complexities of today's organizational society. The School offers preparation of both the generalist and the specialist for professional careers and seeks to improve the quality and character of the individual as citizen, professional, and scholar as well.

More specifically, the purposes of the School are

1. To prepare its graduates for positions in the management of complex organizations.
2. To provide a broad and fundamental education as preparation for positions carrying management and leadership responsibilities.
3. To provide specialized educational opportunities as preparation for career positions in professional disciplines or functional areas.
4. To explore in all their forms, through education and research, the content, interactions, and interdependencies of disciplines and institutions in the public and private sectors, both nationally and internationally.
5. To make available the School's resources to business, health, government, community, and other organizations in both the metropolitan area and the larger community.
6. To foster understanding and advancement of knowledge and skills in the world community through research, education, and scholarly exchange with governments, institutions, and organizations engaged in the solution of international trade and investment problems and in the management of human settlements.

### Regulations

See Admissions; Fees and Financial Regulations; University Regulations.



**Attendance**

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

**Withdrawal**

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances and requires certification by the instructors of courses for which the student is registered that the student is doing passing work (see Withdrawal, under Regulations).

**Adding Courses**

Courses may not be added after the first two weeks of classes in any semester.

**Independent Study Plan**

A junior, senior, or graduate student of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis.

**Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the dean.

**Students from Other Schools Within the University**

Degree candidates from other schools of the University cannot register for more than 18 hours of credit in courses from the Bachelor of Accountancy or Bachelor of Business Administration degree programs or 12 hours of credit from the Master of Accountancy, Master of Taxation, or Master of Business Administration degree programs. Typically, a maximum of 6 hours of credit is permitted in courses from the Bachelor of Accountancy program, unless an advisor recommends an additional 3 credit hours.

**Common Body of Knowledge**

Programs leading to the degrees of Bachelor of Accountancy, Bachelor of Business Administration, Master of Accountancy, Master of Taxation, and Master of Business Administration include the equivalent of at least one year of work in the following areas:

1. A background of the concepts, processes, and institutions in the production and marketing of goods and services and the financing of the business enterprise or other forms of organization.
2. A background of the economic and legal environment as it pertains to profit and nonprofit organizations, along with ethical considerations and social and political influences as they affect such organizations.

3. A basic understanding of the concepts and applications of accounting quantitative methods, and information systems.
4. A study of organization theory and behavior and interpersonal communications.
5. A study of administrative processes under conditions of uncertainty, including integrating analysis and policy determination at the overall management level.

### **The Bachelor's Degrees**

The School offers programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration with major fields in business economics and public policy; finance; human resources management; information systems; international business; logistics, operations, and materials management; and marketing.

### **Entrance Requirements**

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class include

1. An acceptable certificate of graduation from a U.S. secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.

International students may be considered for admission with an equivalent foreign secondary certificate. A student presenting a U.S. secondary certificate or its foreign equivalent must also show competence in the English language by scoring not less than 550 on the first taking of the TOEFL or 600 on the second taking. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on TOEFL and score 5 out of 6 on the Test of Written English (TWE) will be exempted from this requirement. Depending on the results of this test, students may be required to enroll in a full-time program in English before beginning studies in a degree program.

2. Standardized test scores submitted on the Scholastic Aptitude Test, or on the American College Testing battery. In addition, it is strongly recommended that scores on College Board Achievement Tests in English composition and mathematics be submitted. Although no minimum scores are prescribed, test results are an important factor in determining admission eligibility. Students with SAT verbal scores below 500 and SAT math scores below 550, or with ACT composite scores below 25, must show superior performance in their secondary school programs for favorable consideration for admission.

Criteria for admission include a strong high school record and a satisfactory performance on the College Board examinations. It is recommended that the examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the test. In applying for the test, the applicant should specify that the



scores be sent to the Office of Admissions, The George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, P.O. Box 168, Iowa City, Iowa 52243. It is recommended that the applicant take the tests in October of the senior year.

### **Admission With Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University, are as follows.

Any student newly admitted to the School of Business and Public Management who is from a country where English is not an official language must take an English as a Foreign Language placement test. Students do not have to take the placement test if they score 600 or higher on TOEFL and score 5 out of 6 on the Test of Written English (TWE). A student failing to pass this examination will be required to complete successfully the appropriate English composition course or courses, and the assignment of credit for any previously completed courses at another institution will be held pending completion of this requirement.

Students who have accumulated fewer than 30 credit hours of transferable, relevant academic credit must have a minimum 2.5 cumulative grade-point average and meet freshman admission standards. Students who have accumulated 30 or more hours of transferable credit must have a cumulative grade-point average higher than 2.5. Advanced standing may be awarded for properly certified courses taken at regionally accredited colleges or universities for which the student received a grade of C or better, and may be applied toward a degree, provided they are comparable to the curricular requirements of the degree.

In no case will more than 60 credit hours of advanced standing be granted for course work completed at regionally accredited community or junior colleges. These 60 hours may include credit granted for completed course work equivalent to SMPP 104 and Mgt 119. Certain courses (one course per area up to a maximum of three courses), comparable to this School's courses numbered 101-200, taken at a regionally accredited community or junior college with an earned grade of C or better, may be accepted for credit only after SMPP 197, *Strategy Formulation and Implementation*, is successfully completed with a grade of C or better in the senior year.

Although a grade of D is not acceptable for transfer of credit, the course may be used to waive a comparable curricular requirement. Credits earned with a D grade may not, however, be counted toward the total number of credit hours required for the degree. Any course completed with a grade of D or better may not be repeated for the purpose of earning degree credit. An exception to this rule is the freshman English composition requirement, Math 31 or 51 (or their equivalents), and all accountancy courses. Any student earning a D in such courses at another institution may be required to repeat the courses at this University.

All credit will be evaluated by the School, which reserves the right to refuse credit for transfer in whole or in part or to allow credit provisionally.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, Rice Hall, The George Washington University, Washington, D.C. 20052.

A student wishing to transfer into the School from another division of this University must submit a formal application of transfer to the Office of Admissions in Rice Hall.

Courses taken in another degree-granting division of this University may be applied toward a degree in this School, provided they are comparable to the curricular requirements of the degree. A maximum of 90 credit hours of such

credit may be applied toward a degree program in this School. However, in no case will more than 45 credit hours of undergraduate course work taken at the University in nondegree status be allowed toward meeting degree requirements in this School. Credit for correspondence or home-study courses will not be applied toward a degree in this School.

### **Degree Requirements**

#### **Academic Work Load**

A full-time student not on probation may not ordinarily take more than 15 credit hours. A full-time student on probation may take no more than 12 credit hours of course work. A student employed more than 20 hours a week, who is not on probation, may not take more than nine credit hours.

A full-time student whose overall grade-point average is 3.5 or higher may take up to 18 credit hours. A student employed more than 20 hours a week, whose grade-point average is 3.5 or higher, may take up to 12 credit hours.

A student who accepts employment after registration or at any time during a semester must report immediately to the Director of Academic Advising and Student Services so that the program may be adjusted if necessary.

Exceptions to these rules require the approval of the director.

#### **Scholarship Requirements**

A student must have the following to graduate: (1) an overall grade-point average of at least 2.0 and (2) a grade-point average of at least 2.0 in all required 100-level B.B.A. or B.Accy. courses and field-of-instruction-related courses. All courses taken at George Washington University that are acceptable for credit toward the bachelor's degrees are to be included in the overall grade-point average calculation. Elective courses in or out of the School of Business and Public Management cannot be used as substitutes for required courses in the calculation of the major field grade-point average.

#### **Dean's Honor List**

The names of students who achieve a grade-point average of 3.5 or higher are placed on the Dean's Honor List for that semester. Appearance on the list is limited to (1) full-time students registered for a minimum of 12 credit hours (provided that the 12 hours are taken for a grade) and (2) part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

#### **Incomplete/Authorized Withdrawal**

Conditions under which the grades of I (Incomplete) or W (Authorized Withdrawal) may be assigned are described under Regulations.

The grade of I must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of I is assigned. An Incomplete that is not changed within this period automatically becomes an F. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of I cannot be changed by re-registering for the course here or by taking its equivalent elsewhere.

The grade of Z (Unauthorized Withdrawal) is assigned when students are registered for a course they have not attended and in which they have done no substantial graded work. The grade of Z is not calculated in the overall and major field grade-point averages.



### Probation

A student whose grade-point average (either overall or in the major field) falls below 2.0 after completing a minimum of 12 credit hours of study will be placed on probation. Probation by overall grade-point average extends over the period in which the student attempts another 12 credit hours of work, which may include remedial studies as prescribed. Probation by major field extends over the period in which the student attempts 6 credit hours of study in major field course work.

### Suspension

A student whose grade-point average (either overall or in the major field) is 1.5 or below in any semester or remains below 2.0 at the end of the probationary period will be suspended. A student suspended for poor scholarship may apply for readmission after the end of the fall or spring semester following the date of suspension. To be considered for readmission, the student must submit evidence of remedial activity performed during the suspension period and evidence of renewed potential ability to do college-level work. No advanced standing will be assigned for academic work completed while the student is suspended, but the student may petition the dean for consideration of advanced standing after completing a minimum of 12 credit hours of course work here and achieving a cumulative and major field grade-point average of at least 2.0.

A student readmitted after suspension is on probation and must maintain a current grade-point average of at least 2.5 for each 12 credit hours of work undertaken until the cumulative and major field grade-point average are at least 2.0. In no case will the overall probationary period after readmission exceed 24 credit hours of study or the major field probationary period exceed 12 credit hours of study. A student suspended twice for poor scholarship will not be readmitted.

### Pass/No Pass Option

A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with the approval of the advisor and the dean, take one course a semester and receive a grade of P, Pass, or NP, No Pass, which will be recorded on the student's transcript but will not be reflected in the grade-point average. No student will be allowed to take more than four pass/no pass courses. A student must sign up for such an option at registration. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the last date to drop a course (except in the case of a prerequisite to Math 51). Required courses may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in the University.

### Grade of F

Should a student earn a grade of F in a required course, that course must be repeated for a passing grade at George Washington University. A grade of F earned in a required or elective course remains a part of the student's record and is calculated into the grade-point average.

### Residence

A minimum of 30 credit hours, including at least 12 credit hours in required B.B.A. or B.Accy. courses, must be completed while registered in the School of Business and Public Management. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Business and Public Management.

### Earning Credit or Waiving Requirements by Examination

A student may earn credit up to a maximum of 30 credit hours or waive curricular requirements by performing satisfactorily on the following tests:

**College-Level Examination Program (CLEP)**—See Admissions for general information on the CLEP tests. CLEP tests in Introduction to Business, Commercial Law, and Data Processing are limited to 3 credits each of advanced standing. CLEP tests in general mathematics, college algebra/trigonometry, English composition, and more advanced courses in accounting and business administration are not accepted for advanced standing. Matriculated students who wish to receive credit for CLEP General and Subject Examinations must receive prior approval, through petition, of their advisor and the Director of Academic Advising and Student Services.

**Advanced Placement Tests and Achievement Tests**—See Admissions.

**Examinations for Waiving Curriculum Requirements**—The School of Business and Public Management does not administer waiver examinations. However, certain arts and sciences courses may be waived, and in some instances credit may be assigned, by satisfactorily passing a special departmental examination approved by the department or designated advisor. Requests to take the examination should be made to the designated advisor and the required fee paid at the Office of the Cashier before the date set for the examination.

### The Bachelor of Accountancy

The principal objective of the Bachelor of Accountancy degree is preparation for a professional career in accounting. Professional preparation requires specialization in the acquisition of accounting knowledge as well as a general education in English, humanities, social sciences, mathematics, and sciences. A common body of knowledge in business administration is taken, with emphasis on the accounting program. An additional objective is the preparation of students for a fifth-year or Master of Accountancy program that is intended to meet the academic needs of students seeking professional accounting careers in the public or private sector, which currently demand high entry-level academic achievement.

One hundred twenty credit hours are required for graduation. To be accepted in the Bachelor of Accountancy program a cumulative grade-point average of 2.5 or higher is required at the start of the junior year. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. Math 3, 6, 9, and 10 may not be used for credit toward the Bachelor of Accountancy.

#### Curriculum for the Pre-Accountancy Program

**Freshman Year**—Econ 11-12; Engl 9 or 10, 11; Math 31-32 or 51-52; PS 2; Soc 1; a two-course sequence chosen from BiSc 3-4, Chem 3-4, Geol 1-2, Phys 9-10.

**Sophomore Year**—Accy 51-52; Econ 121; Psyc 1, 8; Phil 45 or 51, and 135; Stat 51; Comm 111; Mgt 58.

#### Curriculum for the Accountancy Program

**Junior Year**—Accy 101, 121, 151, 152 or 162, 161, 191; Fina 120; MLOM 140; SMPP 191; Engl 102.

**Senior Year**—Accy 132, 171, 181; Mgt 107 or 110; IBus 160 or 166 or 171; MLOM 188; SMPP 101, 197 (SMPP 197 must be taken at GW); Stat 103; one 3-credit elective chosen from courses offered by Columbian College or the School of Business and Public Management.

### The Bachelor of Business Administration

One hundred twenty credit hours of course work are required for graduation. To be recommended by the Faculty for graduation, candidates are required to



complete, in addition to the appropriate freshman and sophomore work, a minimum of 60 credit hours of course work in the junior and senior years selected from one of the major fields offered by the School. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. The major field must be selected no later than the first semester of the junior year. Electives in the junior and senior years are restricted to appropriate 100-level courses chosen in consultation with the advisor. Math 3, 6, 9, and 10 may not be used for credit toward the B.B.A. degree. The second semester of a first-year language course that was previously studied in high school may be taken as a sophomore elective, provided the student places (via test) at this level.

#### **Curriculum for the First Two Years for All Bachelor of Business Administration Students**

**Freshman Year**—Econ 11–12; Engl 9 or 10, 11; Math 31–32 or 51–52; a two-course sequence chosen from BiSc 3–4 or 11–12, Chem 3–4 or 11–12, Geol 1–2, Phys 1–2 or 9–10; a two-course sequence chosen from AmCv 71–72, Anth 1–2, Geog 1, 2, or 3, Hist 39–40 or 71–72, PSc 1–2, Soc 1–2.

**Sophomore Year**—Accy 51–52; SMPP 51; Mgt 58; Psc 1, 8; Stat 51 or 53; a two-course sequence chosen from Art 31–32 or 71–72; Chin 3–4; Clas 71–72; Engl 51–52, 61–62, or 71–72; Fren 2–3; Ger 3–4, 9–10, or 51–52; Ital 2–3; Mus 3, 4; Phil 45, 51, 52, or 71; Rel 1, 2, 9, 10, or 23; Slav 3–4, 5–6, or 91–92; Span 2–3; Comm 1, 111, or 112; or SpHr 11; one 3-credit elective chosen from courses other than accountancy, economics, finance, international business, management science, strategic management and public policy, and marketing, logistics, and operations management.

#### **Curriculum for B.B.A. Major Fields**

The academic programs comprising these major fields are designed to provide the broad foundation required for eventual leadership in either business or governmental administration. Each major field consists of 33 credit hours of required general business administration courses and 15 hours of required field-related courses. Twelve hours of electives, normally advanced courses in liberal arts subjects, are required in each major field but are not included in the calculation of the major field grade-point average.

**Junior Year**—Mgt 110; Fina 120; MLOM 140; SMPP 191; Econ 121; one course chosen in consultation with the advisor from Accy 101, 111, 121, 161; two courses selected from the chosen major field; two 3-credit electives chosen in consultation with the advisor.

**Senior Year**—SMPP 101, 104, 197 (SMPP 197 must be taken at GW); MLOM 188; Psc 144 or Mgt 107 (students in marketing substitute MLOM 142); three courses selected from the chosen major field; two 3-credit electives chosen in consultation with the advisor.

The major field must be selected no later than the first semester of the junior year. The student should contact the office of Academic Advising and Student Services to declare a major field and receive the name of the designated faculty advisor. Major fields are described below (an asterisk indicates that the course is required for the major field).

**Business Economics and Public Policy**—This field is directed toward developing understanding and skills applicable to a wide variety of positions in business and public-sector organizations. The social, legal, political, and economic environment of business and the micro- and macroeconomic foundations of governmental programs and regulatory activity are studied to establish a basis for developing and evaluating effective business responses. The program is con-

cerned with the continuing business-government dialogue on effective and equitable relations between the two sectors of the economy.

The following courses provide a basic academic foundation in the field of business economics and public policy: Mgt 117; IBus 171; Econ 101,\* 102,\* 136, 158, 159, 161, 162, 181-82; PSc 116, 117, 118; PAd 125.

**Finance**—This field helps students develop the skills required for entry-level employment in corporations, financial institutions, and the public sector. Corporations employ entry-level finance specialists for cash, credit, or inventory analysis or management and for work in bank relations and capital budgeting. Financial institutions offer opportunities for entry-level finance specialists to analyze specific securities and to assist in loan analysis. The government sector looks to finance students as potential financial analysts. The field also provides an excellent foundation for graduate work, especially the study of law.

The following courses provide a basic academic foundation in the field of finance: Accy 111 or 121; Fina 123,\* 124,\* 130, 132 or 133, 135; IBus 171.

**Human Resources Management**—This field is concerned with all aspects of the employment of human resources in business organizations. Entry-level career opportunities are in such fields as personnel management, employee relations, collective bargaining, and manpower utilization. Since the field focuses on the management of human resources in a general sense, it also prepares the student for responsibilities associated with general management and leadership.

The following courses provide a basic academic foundation in the field of human resources management: Mgt 115,\* 117\*; Comm 121; Jour 145; Psych 129, 131.

**Information Systems**—Students taking this field develop a firm foundation in the use of the computer as a tool in solving information problems in organizations and are recruited by public and private sector organizations for positions as programmer/analysts and systems designers. These entry-level positions lead to careers in the marketing of computer hardware and software, systems consulting, and management.

The following courses provide a basic academic foundation in the field of information systems: CSci 157, 158; Mgt 119,\* 120,\* 121,\* 122\*; Stat 130, 131.

**International Business**—This field provides the basic academic foundations for entry-level positions in international business, particularly in multinational corporations, international banks, and government agencies. Such organizations include the Departments of Commerce, State, and Treasury, plus international institutions such as the Export-Import Bank, World Bank, and Overseas Private Investment Corporation. Students in this field are encouraged to include two years of a modern foreign language in their preparatory background.

The following courses provide a basic academic foundation in the field of international business: Fina 123, 135; MLOM 143, 148, 150; IBus 160,\* 166,\* 168, 171,\* 173, 175; MLOM 182; Econ 181-82; T&T 104.

**Logistics, Operations, and Materials Management**—Students in this field will become equipped to contribute to the national effort to achieve economy, efficiency, and innovative competitive behavior for the American economy. Many positions in industry and government that deal with material and service requirements, rates of consumption, acquisition, mobility, maintenance, and quality assurance require the skills learned in this field. The field is designed to prepare students for entry-level positions in the planning and control of the flow of material through the productive system and the external sourcing of required goods and services.

The following courses provide the foundation for effective functioning in the field of logistics, operations, and materials management: Mgt 117, 119; MLOM 143, 180,\* 181, 182, 183,\* 184.\*



**Marketing**—This field provides understanding of complex and changing environments and their effects on marketing activities and institutions; dynamics of buyer behavior; demand, market segments, and cost-volume profit relationships of marketing programs; and skills in formulating and implementing comprehensive marketing plans. Typical entry-level positions are advertising account executives, marketing research project managers, retail assistant buyers, and sales representatives for consumer or industrial products firms.

The following courses provide a basic academic foundation in the field of marketing (please note that MLOM 142 cannot be used as a field of instruction course): MLOM 143,\* 148, 149, 150,\* 152, 159,\* 180, 182, 183; IBus 160, 166; Jour 145; Mgt 119; Stat 105.

### Secondary Field of Study

A secondary field of study in business administration is available in the School of Business and Public Management. See the brochure "Secondary Fields of Study," available in the Office of Academic Advising and Student Services.



## ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean M.A. East

Associate Deans H.R. Nau, J.R. Millar

### Introduction

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of The George Washington University from 1965 to 1988.

### The Degree of Bachelor of Arts

The Elliott School offers programs leading to the degree of Bachelor of Arts in the fields of international affairs, East Asian studies (China or Japan), Latin American studies, and Middle Eastern studies. Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Curricula draw heavily on the various academic departments of the University. Programs are designed to foster a liberal education that focuses on a solid understanding of major historical and contemporary issues in international affairs; the programs tend to have a broader base than a major in a traditional academic discipline.

### Entrance Requirements

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.

2. The principal's statement that the applicant is prepared to undertake college work.

3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on the Scholastic Aptitude Test, or on the American College Testing battery.

It is recommended that the College Board examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

Consideration can be given to the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all the requirements stated here. Appropriate scholastic aptitude tests may be prescribed.

### Admission with Advanced Standing

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows. Applicants who have accumulated at least 30 credit hours (or the equivalent) of academic credit at another regionally accredited college or university may be admitted to the Elliott School of International Affairs as transfer students with advanced standing. Those who have achieved a grade-point average of at least 3.0 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 credit hours of acceptable credit must meet entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of C or above, provided that such courses are comparable to the curriculum requirements for the degree sought in the Elliott School. In the case of course work completed at a two-year college, no more than 66 credit hours of credit may be applied as advanced standing toward a degree in this School.

Although a grade of D in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of D will not, however, be assigned as advanced standing.

The Elliott School reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.



Students wishing to transfer from another division of the University into a degree program in the Elliott School must submit to the Office of Admissions a formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.5 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of Continuing Education may be applied toward a degree in this School.

All transfer students must satisfy the residence and course requirements for degrees awarded by the Elliott School.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **General Requirements for the Degree**

#### **Academic Work Load**

The normal academic work load for a full-time student is 15 credit hours. A full-time student not on probation may take a course load of up to 17 credit hours. A student with a strong academic record may take up to 18 credit hours with the approval of the dean. Students on probation are limited to 13 hours.

#### **Attendance**

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

#### **Scholarship Requirements**

In order to graduate, a student must have the following: (1) 120 credit hours (or 90 credit hours if the student qualifies for the special 90-credit-hour program) of passing grades (courses in exercise and sport activities cannot be included in the required hours); and (2) a cumulative grade-point average of at least 2.0.

#### **Dean's Honor List**

The name of every student who attains a 3.5 grade-point average in course work is placed on the Dean's Honor List for that semester. Appearance on the list is limited to full-time students registered for a minimum of 12 credit hours in a given semester and to part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

#### **Academic Standing**

A student whose cumulative grade-point average is less than 2.0 but at least 1.0 any time after having enrolled in a minimum of 24 credit hours is placed on probation: "first probation" for the initial semester, "second probation" if continued on probation for a second semester. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 12 credit hours have accrued. A student on probation is limited to no more than 13 credit hours of course work per semester.

A student who resumes a cumulative grade-point average of 2.0 or more after a first or second semester on probation is removed from probationary status. Failure to resume a cumulative grade-point average of 2.0 after two successive semesters on probation results in suspension. The Dean's Council may continue a student on probation if satisfactory progress is demonstrated during the probation period.

A student whose cumulative grade-point average falls below 1.0 any time after having enrolled in a minimum of 24 credit hours as a student in the Elliott School will be suspended.

Students who are suspended for poor scholarship may apply for readmission after the lapse of one fall or spring semester. To be considered for readmission, the student must submit evidence to the Dean's Council of conduct during absence from the University which indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

### **Withdrawal**

Withdrawal without academic penalty after the end of the fifth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

### **Incomplete/Authorized Withdrawal**

Conditions under which the grades *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described under Regulations.

*Changing an Incomplete*—The grade of *I* must be changed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An Incomplete that is not changed within this period automatically becomes an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean, or the appropriate committee, for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be changed by re-registering for the course here or by taking its equivalent elsewhere.

### **Residence**

A minimum of 30 credit hours, including at least 12 hours in the major field, must be completed while registered in the Elliott School of International Affairs. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the dean to pursue work elsewhere, the last 30 credit hours must be completed in the Elliott School.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the dean.

### **Internships**

Internships offer students the opportunity to make practical use of the knowledge they acquire in the classroom. Undergraduates who have completed at least 30 credit hours are eligible to arrange internships for credit. Academic work in the field of the internship is required.

Internships are available in the private and public sectors. Students are responsible for locating their own internships; listings are posted in the GW Career and Cooperative Education Center.



### **Regulations on Study Abroad**

Students are encouraged to travel and study abroad. Those wishing to study abroad must consult their academic advisor and the study-abroad advisor. Students must secure the dean's prior approval for any plan of study abroad if the credit earned is intended to apply to the degree program in which they are registered. A catalogue or other description of the foreign institution or study program must be presented for consideration together with detailed descriptions of the courses to be taken. See Study Abroad Programs.

### **Pass/No Pass Option**

A student in the Elliott School of International Affairs who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course per semester and receive a grade of P, Pass, or NP, No Pass, which will be recorded on the student's transcript but will not be reflected in the cumulative grade average. A student must sign up for such an option at registration. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of registration. Courses in the student's major (except those in which the grade of P or NP is normally assigned) may not be taken on a pass/no pass basis. A transfer student may not elect to take a course on a pass/no pass basis until the second semester of enrollment in the University. No more than six courses in which the grade of P or NP is assigned will apply toward the degree, including courses in which the grade of P or NP is normally given.

### **Additional Requirements for the 90-Credit-Hour Program**

Exceptional students may, when registered as freshmen or sophomores, petition the dean of the Elliott School of International Affairs for admission to a special 90-credit-hour degree program. Supporting evidence in the form of achievement test scores, College-Level Examination Placement (CLEP) scores, and grades earned at George Washington University or any other institution must be supplied. The dean, in consultation with the Dean's Council, will determine eligibility for admission to the program, which takes place when the student enters the beginning of the junior year.

The basic assumption of this program is that the student can waive at least 30 credit hours of freshman or introductory requirements.

In addition to the general and curriculum requirements, students in the 90-credit-hour program must fulfill the following requirements:

1. The student must receive grades of A in 50 percent of the total course work and in 50 percent of the courses required in the major.
2. The student must take at least 60 credit hours in courses beyond the first-group level (numbered above 100).
3. The 90 credit hours of credit must be earned in actual course work, i.e., credit through advanced placement, special examinations, etc., may not be counted in the 90 credit hours required for graduation.

Students who qualify for admission to the 90-credit-hour program are encouraged to begin taking second-group courses (numbered 101-200) as soon as they are qualified to do so and should seek to obtain a waiver of course prerequisites in those disciplines in which they have a strong background.

### **Earning Credit or Waiving Requirements by Examination**

For information on earning credit by examination or waiving curriculum requirements, see your academic advisor in the Elliott School.

### Curriculum Requirements

Curriculum requirements for the first two years are outlined below. Requirements for majors in international affairs, Latin American studies, Middle Eastern studies, and East Asian studies (China or Japan) are outlined under the appropriate heading in Courses of Instruction.

English:	Engl 9 or 10, and 11.....	
Humanities:	AmCv 71-72; Art 31-32 or 71-72; Clas 107, 108, 113; Hmn 1-2, 4, 6; *literature (American, Chinese, East Asian, English, French, German, Greek and Latin, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group philosophy courses; Rel 1, 2.....	
†Language:	Chinese, Japanese, Korean, French, German, Hebrew, Italian, Russian, or Spanish.....	
Math/Science:	BiSc 3-4 or 11-12; Chem 3-4 or 11-12; Geol 1-2; Math 9 and 10 or 30 and 31; Phys 1, 2, 5, and 6, or 9-10; Stat 51, 53, or 91, and 105 or 129; 129, 130; 111, 112.....	
Social Science:	Econ 11-12; Hist 40 and 72; PSc 1, 2.....	
‡Elective:	.....	
	Total.....	

### Secondary Fields of Study

Students can take a secondary field of study, such as business, economics, or languages, in other schools of the University. Students from other schools of the University can take a secondary field of study in international affairs in the Elliott School of International Affairs. See the brochure "Secondary Fields of Study," available in the Student Services Office.

7

\* If a student elects 9 credit hours of literature in any foreign language, this cannot be used to satisfy the language requirement.

† Chin 5-6 is required for East Asian studies (China focus) majors; Japn 3-4 is required for East Asian studies (Japan focus) majors. Greek and Latin are not acceptable for international affairs majors. Latin American studies majors must include Spanish.

‡ Credit is not given for exercise and sport activities courses.



## SCHOOL OF MEDICINE AND HEALTH SCIENCES

The School of Medicine and Health Sciences offers a broad range of undergraduate programs to prepare health sciences professionals for roles in selected disciplines that complement the medical profession. These programs emphasize the interdependent roles and responsibilities of the network of professionals who bring a variety of skills and expertise to the health care team. For specific information on the content and requirements of the programs that follow, see the School of Medicine and Health Sciences *Bulletin* or contact the Office of Health Sciences Programs Administration, School of Medicine and Health Sciences, George Washington University, Washington, D.C. 20037.

### Majors Leading to the Associate in Science Degree

**Nuclear Medicine Technology**—Nuclear medicine technologists are trained in a variety of procedures that trace radioactive substances in the body. The radio-pharmaceuticals reveal the structure and function of various organs, which could not otherwise be detected, thereby assisting physicians in the diagnosis and treatment of disease.

**Prehospital Clinical Medicine**—Prehospital providers are ambulance or rescue squad personnel who are involved in initial evaluation and management of seriously injured or ill patients, interpretation of patient signs and symptoms, and communication of observations to emergency department personnel.

**Radiation Therapy Technology**—Radiation therapy technologists are members of a team of specialists who provide radiation treatment to cancer patients. Radiation therapy technologists are involved in patient care, treatment planning, and the delivery of prescribed radiation treatment.

### Majors Leading to the Bachelor of Science Degree

**Emergency Medical Services**—Emergency medical services personnel may plan and organize programs, supervise prehospital providers, assist in projects that require expertise in emergency medical procedures, and function in the network of information systems that is central to emergency care.

**Medical Technology**—Medical technologists perform and evaluate various laboratory procedures to determine the absence, presence, extent, and basis of disease. As medical investigators, medical technologists perform complex examinations on state-of-the-art instruments and computers in the areas of hematology, chemistry, microbiology, immunology, and blood banking.

**Physician Assistant**—Physician assistants provide a variety of patient care services under the supervision of a physician. Responsibilities include direct patient care involving diagnostic, therapeutic, and preventive medicine. Physician assistants are actively involved in decision making and implementation of therapeutic plans to allow more effective use of a physician's time.

**Radiological Sciences and Administration**—Radiological sciences administrators are prepared to assume the management of technologists in radiology departments. Responsibilities may include implementing quality control procedures and performing specialized radiographic techniques and procedures.

## **DIVISION OF CONTINUING EDUCATION**

*Acting Dean A.O. Smith*

*Assistant Deans B.J. Moreland, G.M. Logan*

### **Introduction**

The Division of Continuing Education administers the University's off-campus credit courses and degree programs. The Division offers noncredit certificate programs, courses and workshops, and conferences and institutes. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community.

The Division works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study for continuing education students. The Division offers courses at the Crystal City Education Center in Arlington, Virginia, and other off-campus locations in the District of Columbia and suburban Maryland and Northern Virginia. The Division also offers, through its Hampton Roads Center, certificate and graduate degree programs in various disciplines at locations in the Hampton, Norfolk, and Virginia Beach area. A wide range of seminars and workshops is available to organizations and individuals from the professional community at several locations, including the new Northern Virginia campus in Loudoun County.

The academic standards of the University are maintained in off-campus credit courses. All programs offered through the University's off-campus programs and administered by this Division are approved through the procedure authorized by the Board of Trustees and the Charter granted by the Congress of the United States. Degrees are granted through the faculties of the degree-granting schools and colleges of the University. Credit earned through off-campus study conforms to academic standards throughout the University. All Division off-campus offerings in Maryland are approved by the Maryland State Board for Higher Education; those in Virginia are approved by the Commonwealth of Virginia Council of Higher Education.

Except as outlined below, all general University regulations apply to students in the Division of Continuing Education. In addition, Division students may be subject to special requirements of the school or college through which they are taking courses.

### **Center for Career Education and Workshops (CCEW)**

CCEW provides a broad spectrum of services focusing on innovative, nontraditional, career-oriented education. Among CCEW programs are noncredit, graduate-level career certificate programs to prepare the legal assistant, publication specialist, landscape designer, fund raising administrator, administrative manager, association executive, information systems specialist, public relations professional, and Washington representative. Other programs are designed to prepare the certified employee benefit specialist, certified financial planner, and credit administrator. Credit courses and test review courses (for CLEP, EIT, FSE, GMAT, GRE, LSAT, MAT, MCAT, and Basic Real Estate) are offered as well.

Workshops and short-term courses provide the opportunity for individuals to be informed of the innovations in their fields. Courses focus on advances in computer technology and train participants to increase personal effectiveness, improve managerial expertise, reinforce leadership ability, identify practical decision-making skills, broaden understanding of systems and concepts, and develop understanding of financial, political, and social strategies. The Professional Development Program, designed to enhance the skills, productivity, and



job satisfaction of an organization's employees, can provide these workshops, credit courses, and noncredit courses on site or through interactive television.

CCEW offers undergraduate certificate programs that combine academic credit courses offered by Columbian College of Arts and Sciences with skill development workshops. The programs include Supervisory Specialist and Communication Studies.

The Center is the site of the University's Continuing Education for Women (CEW) program, which has provided counseling and educational services to women in transition since 1964. Participants benefit from many CEW programs, which currently include group and individual counseling services accredited by the International Association of Counseling Services, Inc. CEW also offers a series of special-interest courses focusing on issues confronting women. For a complete listing of services, courses, and programs, see the CCEW schedule of classes.

### **Office of University Students**

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session, except in special circumstances as approved by the dean.

### **Entrance Requirements**

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension. An applicant who has been denied undergraduate admission within this University will not be considered for admission as a nondegree student for the same semester for which the application was denied.

Applications for admission through OUS for a fall or spring semester should be obtained from and returned to the Office of Admissions. There is no application fee. For admission requirements for students from foreign institutions, see Admissions. For information on registration, please refer to the *Schedule of Classes*.

### **Regulations**

See Admissions, Fees and Financial Regulations, and University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations concerning attendance and withdrawal under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.

Last day to drop a class for credit or to withdraw from the University—

end of the seventh week of classes.

Equivalent amounts of time apply to the summer sessions.

### Academic Work Load

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the dean.

### Scholarship Requirements

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is available in the office of the dean. All grades received in OUS remain on the record; scholarship requirements are based on the total record.

*Grades*—See Scholarship Requirements under University Regulations. There is no limitation on the number of courses that may be taken on a pass/no pass basis in OUS; however, there may be a limit on the number that can be transferred to fulfill degree requirements.

### Incomplete/Authorized Withdrawal

Conditions under which the grades of I (Incomplete) and W (Authorized Withdrawal) may be assigned are described under University Regulations.

*Changing an Incomplete*—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of I on the student's record.

### Change in Program of Studies

*Change Within the Office of University Students*—A student may not change status to that of auditor except with the approval of the dean (see Withdrawal under University Regulations).

*Transfer Within the University*—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester in OUS or upon request from the college or school to which the student is seeking admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

### College Courses for Secondary School Students

Under the auspices of the Office of University Students, well-qualified secondary school students may take college courses for credit in nondegree status at George Washington University. During the academic year, high school juniors and seniors residing in the Washington metropolitan area may enroll in GW courses as part-time, commuting students. Through the Summer Scholar Program, precollege students may enroll in a wide variety of summer courses prior to their junior or senior year of high school. Summer Scholars from outside the Washington area reside on campus in a University residence hall. Local residents may choose to use on-campus housing but are not required to do so. The Summer Scholar Program offers diversified cultural, social, and recreational experiences under the supervision of resident advisors.

*Scholarships*—Secondary school students with outstanding academic records and excellent scores on standardized tests will be considered for full-tuition scholarships. Because the awards are based on academic merit rather than financial need, only the application for admission and supporting credentials are



required for consideration. The amounts awarded cover tuition only and cannot be applied to housing, meals, or fees.

For further information and an application, please write to the Coordinator, College Courses for Secondary School Students, Office of Admissions, George Washington University, Washington, D.C. 20052.

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## SUMMER SESSIONS

Courses are offered during the summer by all degree-granting divisions of the University: Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Medicine and Health Sciences, the National Law Center, the School of Engineering and Applied Science, the School of Education and Human Development, the School of Business and Public Management, and the Elliott School of International Affairs. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours.

Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate college or school within the University. Those who do not wish to work toward a degree at the University may apply through the Office of University Students and are subject to its entrance requirements and regulations stated above.

For a complete statement concerning summer term work, see the Summer Sessions Announcement.

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## COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and special interdepartmental programs. The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

### Hours of Instruction

Classes are scheduled in the morning, afternoon, and evening. Evening and daytime sections of the same course are identical, are taught by the same staff of instructors, and carry the same amount of credit.

### Explanation of Course Numbers

**First-Group Courses**—Courses numbered 1–100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

**Second-Group Courses**—Courses numbered 101–200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the Dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101–200 may not be taken for graduate credit.

**Third-Group Courses**—Courses numbered 201–300 in the Graduate School of Arts and Sciences, the School of Business and Public Management, the Elliott School of International Affairs, and the School of Education and Human Development are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.00 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Nondegree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management.

**Fourth-Group Courses**—Courses numbered 301–400 in the Graduate School of Arts and Sciences are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301–400 in the School of Business and Public Management are limited to doctoral students. In the School of Education and Human Development fourth-group courses, numbered 301–400, are limited to graduate students with master's degrees from accredited institutions.

**Fifth-Group Courses**—Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s are taught by scholars who hold appointments as University Professors. The 700 numbers do not indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. Unless the course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration, 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective colleges.



## Key to Abbreviations

The following abbreviations are used for course designations:

Accy	Accountancy	Kor	Korean
AdSc	Administrative Sciences	Law	Law
AmCv	American Civilization	Ling	Linguistics
Anat	Anatomy	Mgt	Management Science
Anes	Anesthesiology	MLOM	Marketing, Logistics, and Operations Management
Anth	Anthropology	Math	Mathematics
ApSc	Applied Science	ME	Mechanical Engineering
Art	Art	Med	Medicine
ArTh	Art Therapy	Micr	Microbiology
AM	Association Management	MStd	Museum Studies
Bioc	Biochemistry	Mus	Music
BiSc	Biological Sciences	NSc	Naval Science
Chem	Chemistry	NSur	Neurological Surgery
Chin	Chinese	Neur	Neurology
CE	Civil Engineering	Ob&G	Obstetrics and Gynecology
Clas	Classics	OR	Operations Research
Comm	Communication	Opht	Ophthalmology
CpMd	Computer Medicine	Orth	Orthopaedic Surgery
CSci	Computer Science	Path	Pathology
Cnsl	Counseling	Peds	Pediatrics
Derm	Dermatology	Phar	Pharmacology
Econ	Economics	Phil	Philosophy
Educ	Educational Leadership	Phys	Physics
EE	Electrical Engineering	Phyl	Physiology
EMed	Emergency Medicine	PCm	Political Communication
EMgt	Engineering Administration	PPsy	Political Psychology
EngS	Engineering Science	PSc	Political Science
Engl	English	Port	Portuguese
EFL	English as a Foreign Language	Pchi	Psychiatry and Behavioral Sciences
E&RP	Environmental and Resource Policy	Psyc	Psychology
EnHe	Environmental Health	PAd	Public Administration
Envr	Environmental Studies	PubH	Public Health
ExSA	Exercise and Sport Activities	PPol	Public Policy
Fina	Finance	Rad	Radiology
ForS	Forensic Sciences	Rel	Religion
Fren	French	Rom	Romance Literatures
Gnet	Genetics	Rmn	Romanian
Geob	Geobiology	SLP	Service-Learning Program
Geog	Geography and Regional Science	Slav	Slavic Languages and Literatures
Geol	Geology	Soc	Sociology
Ger	Germanic Languages and Literatures	Span	Spanish
Gern	Gerontology	SpEd	Special Education
HCS	Health Care Sciences	SpHr	Speech and Hearing
HSMP	Health Services Management and Policy	Stat	Statistics/Computer and Information Systems
Hist	History	SMPP	Strategic Management and Public Policy
Honr	Honors	Surg	Surgery
HmKn	Human Kinetics	TrEd	Teacher Education
HRD	Human Resource Development	TCom	Telecommunication
HmSr	Human Services	TrDa	Theatre and Dance
Hmn	Humanities	T&T	Travel and Tourism
Idis	Interdisciplinary Courses	Univ	University
IAff	International Affairs	UPRE	Urban Planning and Real Estate Development
IBus	International Business	Urol	Urology
Ital	Italian	WStu	Women's Studies
Japn	Japanese		
Jour	Journalism		

### Credit Hours

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3-3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

### Time of Course Offerings

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the *Summer Sessions Announcement* for additional summer offerings. A *Schedule of Classes* is published each fall and spring semester to provide information concerning the time of course offerings.

### ACCOUNTANCY

Professors A.J. Mastro, F.C. Kurtz, C.M. Paik, M.G. Gallagher, J. Hilmy (Chair), F.W. Segel  
Associate Professors D.R. Sheldon, L.G. Singleton  
Assistant Professors K.E. Smith, L.C. Moersen, P.R. Witmer, C.J. Lin, S.M. Moody  
T. Verghese

See the School of Business and Public Management for programs of study in accountancy leading to the degree of Bachelor of Accountancy.

- 51 **Introductory Financial Accounting** (3) Lin and Staff  
Basic knowledge of financial accounting concepts and standards as an essential part of the decision-making process for the management of private investment and for business and government organizations. Students who have received credit for a similar financial accounting course cannot receive credit for Accy 51. Prerequisite: sophomore standing. (Fall and spring)
- 52 **Introductory Managerial Accounting** (3) Lin and Staff  
Basic knowledge of managerial accounting concepts, procedures, analyses, and internal reports as an essential part of the decision-making process for public- and private-sector organizations. Prerequisite: Accy 51. Students who have received credit for a similar managerial accounting course cannot receive credit for Accy 52. (Fall and spring)
- 101 **Cost and Budgetary Control** (3) Singleton  
Cost behavior and volume-profit relationships, responsibility accounting, standard costs, cost structures for control and decision making, relevant costs, cost concepts, and variance analyses. Prerequisite: Accy 51-52. (Fall and spring)
- 111 **Financial Statement Analysis** (3) Hilmy, Shiu  
Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Accy 51-52. (Fall and spring)
- 121 **Intermediate Accounting** (3) Mastro  
In-depth study of accounting functions and basic theory; acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Accy 51-52. (Fall)
- 132 **Accounting Theory** (3) Hilmy, Segel  
Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Accy 121. (Spring)
- 151 **Business Law for Accountants I** (3) Moersen  
An introduction to the legal process and business law concepts for the professional accountant. Contracts, sales, commercial papers, and the legal liability and ethical standards of professional accountants. Prerequisite: Accy 51-52. (Fall)



- 152 Business Law for Accountants II (3)** Moorsen  
A broadening of business law concepts—partnerships, corporations, agency, secured transactions, trusts, wills, property, bankruptcy, insurance, and securities. Prerequisite: Accy 151. (Spring)
- 161 Federal Income Taxation: Individuals (3)** Smith  
A study of federal income tax concepts with primary emphasis on individuals. Prerequisite: Accy 51–52. (Fall)
- 162 Federal Income Taxation: Corporations, Partnerships, Estates, and Trusts (3)** Smith  
Federal income tax concepts applicable to corporations, partnerships, estates, and trusts; tax research and planning. Prerequisite: Accy 161. (Spring)
- 171 Auditing (3)** Witmer  
Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, audit evidence, professional and legal responsibility, and audit of EDP systems. Prerequisite: Accy 121. (Fall)
- 181 Accounting Systems (3)** Segel, Verghese  
Data processing considerations in the design and operation of accounting systems. Principles of internal control applicable to manual and automated accounting systems. Prerequisite: Accy 101, 121. (Fall)
- 190 Special Topics in Accounting (3)** Staff  
Experimental offering: new course topics and teaching methods. Prerequisite: department approval.
- 191 Advanced Accounting (3)** Mastro  
Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level adjusted statements, source and application of funds. Prerequisite: Accy 121. (Spring)
- 199 Independent Study (3)** Staff  
Assigned topics. Admission by permission of the department chair. (Fall and spring)

## AMERICAN STUDIES

Professors R.H. Walker, Jr., C.C. Mondale, B.M. Mergen (*Director*), H.F. Gillette, Jr., J.M. Vlach  
Associate Professors J.O. Horton, R.W. Longstreth, P.M. Palmer, S. Strasser  
Adjunct Associate Professor P.J. Cressey

### Faculty Advisory Committee

H.F. Gillette, Jr. (*Chair*), D. Bjelajac, C.J. Deering, P.P. Hill, R.L. Humphrey, O. Seavey, R.W. Stephens, D.D. Wallace, Jr., A.M. Yezer

**Bachelor of Arts with a major in American civilization**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite course—AmCv 71–72. Other introductory courses as needed for upper-division courses in a discipline as described below.
3. An American studies core, consisting of AmCv 167, AmCv/Hist 171–72, and AmCv/Engl 160, 161, 162; and a specialized focus, usually developed through at least 12 hours of 100-level courses in a discipline or theme chosen so as to provide a structured approach to the range of American civilization (accepted approaches include sociology, history, literature, history of art and architecture, political science, philosophy and religion, gender studies, urban studies). The proseminar, AmCv 179–80, should be taken in the last full year of residence in preparation for the comprehensive examination that covers the core courses and special discipline or theme.

Special Honors will be awarded to students who fulfill the requirements for the major with a grade point average of 3.5 or better in the core and related courses and 3.0 or better overall and who receive honors on the comprehensive examination.

At least two years of a foreign language and knowledge of statistics or computer programming in the humanities and social sciences is strongly recommended. Students must consult at least once a semester with their American studies advisor.

**Minor in American civilization**—Requirements are 18 hours of 100-level courses, including AmCv 167 and AmCv/Hist 171–72 plus 9 hours chosen from the following two options: (1) AmCv/Hist 771, AmCv/Engl/Hist 772, AmCv/Engl 160, 161, 162; (2) related

courses in American civilization, such as topics in urbanism, gender, black culture, folklife, philosophy and religion, literature, art and/or architecture.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- 50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette  
Introduction to interdisciplinary methods of studying the contemporary city. Major problems of metropolitan life, past and present, analyzed by faculty and community leaders. Emphasis on experiential team projects. Same as Hist/PSG UPRE 50. (Fall)
- 71-72 **Introduction to American Civilization** (3-3) Mergen, Vlach, Palmer, Gillette  
Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. (Academic year)
- 115 **Field Program in Meso-American Archaeology and History** (3 or 6) Humphrey, Mergen  
Field study in Mexico and Central America. Same as Anth 115. (Summer)
- 144 **Explorations in Historical Geography** (3) Mondale  
Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country. Same as Geog 144. (Spring)
- 145 **Folk Arts in America** (3) Staff  
Same as Art 145.
- 160 **Early American Literature and Culture** (3) Seaver  
Same as Engl 160.
- 161 **American Romanticism** (3) Staff  
Same as Engl 161.
- 162 **American Realism** (3) Romines  
Same as Engl 162.
- 165 **Introduction to Folklore** (3) Vlach  
Survey of the forms of folk expression, including verbal, art, music, dance, and material culture. Examination of the materials and methods of folklore research. Same as Anth 165.
- 167 **Themes in U.S. Cultural History** (3) Mondale, Gillette  
An examination of the special ideas, values, and modes of expression that have made American life distinctive, as revealed through a variety of sources, including fiction, popular media, photography and the arts, and material culture. Same as Hist 167. (Fall)
- 171-72 **U.S. Social History** (3-3) Horton  
Same as Hist 171-72.
- 173 **Afro-American History** (3) Horton  
Survey of the Afro-American experience, emphasizing the contributions of black Americans to, and their impact upon, American history. Same as Hist 173 (Spring)
- 174 **Afro-American Literature** (3) Staff  
Study of texts representing the experience of black Americans and the ideas and social forces that have shaped their lives and writings. Same as Engl 174. (Fall)
- 175-76 **American Architecture** (3-3) Longstrech  
Stylistic properties, form and type characteristics, technological developments, and urbanistic patterns are introduced as a means of interpretation of historic meaning. Buildings are analyzed both as artifacts and as signifiers of social, cultural, and economic tendencies. UPRE/AmCv 175: 1600-1860; UPRE/AmCv 176: 1860-present. Same as Art 176 and 191. (Academic year)
- 177 **Introduction to Historic Preservation** (3) Staff  
Washington, D.C., will be the primary exhibit for the study of historic preservation as it has developed over the past century. Experience with preservation issues as shown by examples in other localities will also be discussed. Lectures, class discussions of the readings, and field trips to neighborhoods and sites subjected to preservation efforts. Same as UPRE 177. (Spring)
- 179-80 **Proseminar in American Civilization** (3-3) Walker  
Coordinating course for seniors majoring in American civilization. (Academic year)



- 184 Contemporary American Civilization (3)** Staff  
Examination of the patterns of contemporary American life through study of literature, the arts, and political, social, cultural, and economic trends.
- 185 History of Women in America (3)** DePauw  
Same as Hist 185.
- 186 U.S. Urban History (3)** Stott, Gillette  
History of the American city from colonial foundations to the present, focusing on relationships between social and economic forces with physical form. Special emphasis on transitions from pre-industrial to industrial to metropolitan forms, with attention to implications for public policy and historic preservation. Same as Hist 186. (Fall)
- 192 The American Cinema (3)** Mergen  
History and criticism of American films. The course will enable the student to recognize and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture. Same as Art 192. (Spring)
- 193 Field and Laboratory Research in Archaeology (3)** Cressey  
Same as Anth 193.
- 194 Introduction to Historical Archaeology (3)** Cressey  
Same as Anth 194.
- 195 Independent Study (3)** Staff  
Open to a limited number of American Civilization majors as directed research or as an internship with a Washington museum or historical society. Approval of advisor required. (Fall and spring)
- 197 Oral History and Interview Techniques (3)** Mergen, Gillette  
Introduction to theory and practice of obtaining and using historical data through recorded interviews. Examination of major published works in oral history. Particular attention to ongoing oral history projects in the Washington area. Same as Anth/Hist 197. (Summer)
- 198 Special Topics in American Studies (3)** Staff  
May be repeated for credit provided the topic differs. Admission by permission of instructor.
- 199-200 Senior Thesis (3-3)** Staff  
Directed research project. Open to majors by permission of program director. (Academic year)

## ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, Jr., A.S. Brooks, C.J. Allen  
 Professorial Lecturer D.H. Ubelaker  
 Associate Professor S.L. Simons (Chair)  
 Adjunct Associate Professors C.R. Rose, P.J. Cressey  
 Associate Professorial Lecturer S. Hertz  
 Assistant Professors J.C. Kuipers, R.N. Rasnake (Visiting)  
 Assistant Professorial Lecturers R.K. Evans, B. Hackett, T. Kavanagh, N.L. Benco, P.S. Maloof, H.D. Sues  
 Lecturers A.G. Webster, M.E. Chambers, C. Griggs

**Bachelor of Arts with a major in anthropology**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Anth 1, 2, 3, and 4.
3. Required courses in other areas—(a) 12 credit hours, or equivalent, of introductory French, German, Russian, or Spanish (or another major language approved by the Anthropology Department); (b) 6–12 credit hours of course work in related departments. Recommended for ethnological emphasis are courses in economics, political science, psychology, and sociology; for archaeological emphasis, courses in American civilization, art history, geography and regional science, geology, and history; for emphasis in biological anthropology, courses in anatomy and biological sciences; for emphasis in linguistic anthropology, courses in linguistics and in speech and hearing. Courses in philosophy and statistics are strongly recommended for all anthropology majors.
4. Requirements for the major—24–36 credit hours in 100-level anthropology courses, including Anth 198 and at least one course from each of the following five categories: aspects of culture (courses numbered in the 150s and 199 and 200), linguistics (161, 162,

168, and 169), ethnology (courses numbered in the 170s), biological anthropology (courses numbered in the 140s), and archaeology (courses numbered in the 180s). Students intending to pursue a graduate degree in anthropology should take Anth 157 and at least one course each in archaeology and in biological and linguistic anthropology. With the exception of Anth 202, qualified seniors may enroll in 200-level seminar courses with the permission of the instructor. See the Graduate Programs Bulletin. Up to 6 credit hours of ethnographic or archaeological field school credit may be accepted and applied toward the major, if approved by the department, and majors are encouraged to participate in such summer programs. Opportunities are available for field and laboratory research during the academic year, both within the department and elsewhere in the Washington area. Credit for such work (not to exceed one-quarter of the student's total second-group credit hours in anthropology) may be granted through registration in Anth 195. Candidates for graduation with Special Honors must register for 3 credit hours of Anth 195, Undergraduate Research, and write a paper of special distinction arising out of a program of directed reading or research.

**Bachelor of Arts with a major in classical archaeology and anthropology**—An interdepartmental major offered by the Anthropology and Art Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in other areas: 6 credit hours, or equivalent, of introductory French, German, Latin, Greek, or a Near Eastern language. A second year of language study is strongly encouraged. Since graduate study in archaeology usually involves broader preparation, especially in languages, students intending to pursue graduate study should consult with the departmental advisor as early as possible in their undergraduate programs.
3. Required courses in the major: Anth 3, 183, 184, and one course chosen from Anth 152, 158, 177, or an approved 3-hour course in field work; four courses chosen from Anth 101, 102, 103, 112, 155; two courses chosen from Clas 71, 72, 107, 113, 170; two courses chosen from Hist 107, 108, 109, 110 (students electing Hist 108 should previously have completed Hist 107 or 109).

**Minor in general anthropology**—21 credit hours are required, including Anth 1, 2, 3, 4, 198, and two additional courses in anthropology, which must be taken in different subdisciplines. For the purposes of this minor, the department's courses may be divided into subdisciplines as follows: biological anthropology—Anth 146, 147, 148; archaeology—Anth 182, 183, 184, 185, 186, 190, and 194; anthropological linguistics—Anth 161, 162, 168, and 169; sociocultural anthropology—all other 100-level courses, with the exception of Anth 195 and 196, in which the topic is variable.

**Minor in archaeology**—18 credit hours are required, including Anth 3, four courses chosen from Anth 182, 183, 184, 185, 190, and 194; an approved field or research course or a fifth course chosen from the preceding list.

**Minor in biological anthropology**—15–18 credit hours are required, including Anth 1, 146, 147, and 148; an approved field or research course or an approved course or course sequence in a related field (including biological sciences, geology, psychology, statistics and certain other disciplines).

**Minor in sociocultural anthropology**—18 credit hours are required, including Anth 2 and 198; one course in ethnography (Anth 170–179); Anth 151 or 152; Anth 156 or 157; one course chosen from Anth 150, 153, 155, 158, 159, or 200.

**Minor in cross-cultural communication**—18 credit hours are required, including Anth 2 or 4, 161, 162; Anth 150 or 159; one course in ethnography (Anth 170–179); one course chosen from Anth 153, 155, 158, 163, 165, or 168.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

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| <b>1 Introduction to Biological Anthropology (3)</b>   | <b>Brooks and Staff</b>                  |
| Survey of human evolution, genetics and physical variation, and primatology.                       |  |
| Frequent laboratory exercises. Laboratory fee, \$15. (Fall and spring)                             |  |
| <b>2 Introduction to Sociocultural Anthropology (3)</b>  | <b>Allen, Krulfeld, Simons, Kavanagh</b> |
| Survey of the world's cultures, illustrating the principles of cultural behavior (Fall and spring) |  |



- 3 Introduction to Archaeology (3)** Humphrey, Brooks, Webster  
Introduction to archaeological survey and excavation techniques and laboratory methods of dating and analysis. Brief history of archaeology and survey of world prehistory. Films and laboratory exercises. (Fall and spring)
- 4 Language in Culture and Society (3)** Kuipers  
Comparison and analysis of how cultures use language to communicate. The relationship of language to issues of human nature, gender, race, intelligence, artistic expression, and power. (Spring)
- 115 Field Program in Meso-American Archaeology and History (3 or 6)** Humphrey, Mergen  
Field study of archaeological and historical sites in Mexico and Central America. Same as AmCv 115. (Summer)
- 146 Biological Anthropology of Modern Man (3)** Ubelaker  
An overview of human variation, with special emphasis on the skeleton. Includes history of physical anthropology, individual and population variations, archaeological recovery of human remains, paleodemography, growth, paleopathology, and forensic anthropology. Prerequisite: Anth 1. (Spring)
- 147 Introduction to Hominid Evolution (3)** Brooks  
The fossil record of hominid evolution considered in the light of evolutionary theory. Brief review of the earlier human antecedents, with concentration on the Pleistocene remains. Laboratory fee, \$15. Prerequisite: Anth 1. (Spring, even years)
- 148 Primatology (3)** Sues  
Physical and behavioral characteristics of the various primate groups and their relationship to human physical and cultural evolution. Frequent meetings at the National Zoological Park. Prerequisite: Anth 1. (Fall)
- 150 Comparative Value Systems (3)** Krulfeld  
World views, conceptual systems, and value orientations of representative cultures throughout the world.
- 151 Comparative Economic Systems (3)** Krulfeld  
The cross-cultural analysis of economic organizations, including hunters and gatherers, herders, cultivators, and peasants; the relationship of economy to ecology and to other aspects of culture; and the impact of the outside world on these economies.
- 152 Man, Culture, and Environment (3)** Humphrey  
Basic principles of cultural ecology. Human interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems.
- 153 Psychological Anthropology (3)** Simons  
Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health. Prerequisite: Anth 2 or permission of instructor. (Spring)
- 154 The Anthropology of Law (3)** Rasnake and Staff  
Cross-cultural examination of law and judicial systems. Comparison of processes of adjudication and mediation, including the logic of legal arguments, court procedures, and dispute resolution. Prerequisite: Anth 2 or permission of instructor. (Spring)
- 155 Religion, Myth, and Magic (3)** Simons, Allen  
Theories of religion developed by anthropologists; survey of world religions with emphasis on preliterate societies; religious processes and change. Same as Rel 155.
- 156 Political Anthropology (3)** Rasnake and Staff  
Comparative analysis of political systems, including bands, tribes, chiefdoms, and states. Political processes, such as factionalism, styles of leadership, political ritual, and the wider institutional milieu. Prerequisite: Anth 2 or permission of instructor. (Fall, odd years)
- 157 Comparative Kinship and Social Structure (3)** Simons, Allen, Hertz  
Comparative analysis of social patterns and roles in kinship, economic and political organization. Emphasis on preliterate societies, with some attention to complex systems. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 158 Art and Culture (3)** Krulfeld, Humphrey, Allen  
The art of tribal society, including the role of art in culture, influences upon the artist, and beliefs and practices associated with art production.

- 159 Symbol, Cognition, and Society (3)** Allen  
The study of culture through the analysis of symbolic systems including myth, cosmology, folklore, art, ritual, political symbolism, and the symbolic study of kinship. Prerequisite: Anth 2 or permission of instructor. (Fall, odd years)
- 161 Language, Culture, and Experience (3)** Kuipers  
Varieties of linguistic structure; the interrelationship of cognition and verbal behavior; the origin and evolution of human language; verbal organization of perception and emotion. Prerequisite: Anth 4 or permission of instructor. (Fall)
- 162 Discourse, Power, and Performance (3)** Kuipers  
Linguistic variation and change in discourse practices; social and political correlates of linguistic interaction; verbal art. Prerequisite: Anth 4 or permission of instructor. (Spring)
- 163 Anthropology of Visual Communication (3)** Allen and Staff  
Still and motion-picture photography as an integral aspect of anthropological research. A study of recent and historic ethnographic films and an introduction to the forms and methods of making visual ethnographic records. Prerequisite: Anth 2 or permission of instructor. Material fee, \$15.
- 165 Introduction to Folklore (3)** Vlach  
Same as AmCv 165.
- 166 Methods of Linguistic Analysis (3)** Kuipers  
Phonetics, grammatical analysis, principles of lexicography, techniques of linguistic reconstruction, and other tools of anthropological linguistic research. (Fall)
- 169 Intensive Study of a Language (3)** Kuipers  
Analytic study of a selected language, ordinarily one not frequently studied in a university context (such as an American Indian language), as an illustration of the methods of anthropological linguistics. Prerequisite: Anth 168. (Spring or summer)
- 170 Cultures of the Caribbean (3)** Griggs and Staff  
Culture history and ways of life among the area's various cultural groups up to the ethnographic present. Prerequisite: Anth 2 or permission of instructor. (Summer)
- 171 Native Peoples of North America (3)** Simons  
Comparative study of Indian groups representative of each of the continent's culture areas. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 172 Cultures of South America (3)** Allen, Rasnake  
Comparative study of native American, Iberian, and African cultures of South America and their interactions. Emphasis on world view, interethnic relations, and culture change. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 173 Cultures of the Pacific (3)** Staff  
Culture history and ways of life among native peoples of Melanesia, Micronesia, and Polynesia. Prerequisite: Anth 2 or permission of instructor.
- 175 Topics in Ethnography (3)** Humphrey, Krulfeld, Kuipers  
Intensive study of the ways of life of selected Asian or Circumpolar people. Specific area to be announced in the Schedule of Classes. May be repeated for credit. Prerequisite: Anth 2 or permission of instructor.
- 177 Cultures of the Near East (3)** Maloof  
Geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East; emphasis on the Arab world. Prerequisite: Anth 2 or permission of instructor.
- 178 Cultures of Africa (3)** Staff  
Comparative examination of the history, cultural development, and contemporary problems of sub-Saharan African cultures. Prerequisite: Anth 2 or permission of instructor.
- 182 New World Archaeology (3)** Humphrey  
History of American archaeology; survey of North American culture history from human entry into the Americas during the Pleistocene period until the time of the first European contacts. Prerequisite: Anth 3 or permission of instructor. (Spring)
- 183-84 Old World Prehistory (3-3)** Brooks, Evans  
Survey of human prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced civilizations. Anth 183: Paleolithic



and Mesolithic cultures. Anth 184: Neolithic and Bronze Age cultures. Prerequisite: Anth 3. (Academic year)

- 185 **Archaeology of Meso-America** (3) Humphrey, Chambers  
Culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.
- 186 **Archaeology of South America** (3) Allen  
Culture history of pre-Columbian South America, with a focus on the Andes from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.
- 190 **Ethnohistory** (3) Allen, Humphrey  
Reconstruction of the history of a selected preliterate society through the analysis of historical documents, oral traditions, archaeological remains, and other indirect sources. Specific topic to be announced in the *Schedule of Classes*. Same as Hist 190.
- 191 **Anthropology, Drama, and the Human Experience** (3) Garner, Allen  
Exploration of the relationships among social interaction, ritual, and dramatic performance. Improvisation workshops and discussion based on readings about non-Western cultures. Same as TrDa 140.
- 192 **Development Anthropology** (3) Rasnake and Staff  
The impact of the world economy on nonindustrial societies. Analysis of the role of anthropology in international development programs aimed at alleviating problems in the Third World. Prerequisite: Anth 2 or permission of the instructor.
- 193 **Field and Laboratory Research in Archaeology** (3) Cressey  
Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording photography, preservation, stratigraphy and environmental reconstruction, typology, use-wear analysis, and spatial analysis. Specific research area and topics announced in the *Summer Sessions Announcement*. Same as AmCv 193. (Summer)
- 194 **Introduction to Historical Archaeology** (3) Cressey  
Survey of the basic data and methods of research in the material culture of recent history. Same as AmCv 194. (Spring)
- 195 **Undergraduate Research** (arr.) Staff  
Individual research problems to be arranged with a member of the faculty. May be repeated for credit. Prerequisite: Appropriate introductory course or permission of instructor.
- 196 **Special Topics in Anthropology** (3) Staff  
Courses offered by visiting faculty; experimental offerings. Topic to be announced in the *Schedule of Classes*. May be repeated for credit. Prerequisite: Anth 2 or permission of instructor.
- 197 **Oral History and Interview Techniques** (3) Staff  
Same as AmCv/Hist 197.
- 198 **Foundations of Anthropology** (3) Allen, Krulfeld  
The development of anthropological thought as seen in historical context. Exploration of selected basic concepts and theories of contemporary anthropology. To be taken in the junior or senior year. Prerequisite: Anth 2 and 3.
- 199 **Techniques of Field Research** (3) Staff  
Training in skills for various field situations, including techniques of observation, participation, documentation, and the handling of practical field problems. Intended for those doing research in the United States or abroad or anyone living or working in a foreign culture. Prerequisite: Anth 2 or permission of instructor.
- 200 **Methods in Sociocultural Anthropology** (3) Krulfeld  
Approaches to library and field research. Conceptual bases and biases in the delineation of problems and in the selection, analysis, and organization of data. Students will design and carry out their own field projects in the Washington area. Prerequisite: Anth 2 or permission of instructor. (Spring)

## APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science.

- 57 **Analytical Mechanics I** (2) Jones and Staff  
First half of a one-year sequence. Concepts of statics: force systems, conditions of force and moment equilibrium, simple structures, distributed forces, centroids,

- internal forces, friction, moments of inertia. Prerequisite or concurrent registration: ApSc 113, Phys 14. (Fall and spring)
- 58 Analytical Mechanics II (3)** Eftis and Staff  
Second half of a one-year sequence. Concepts of dynamics: kinematics of particles, velocity and acceleration, translating and rotating reference frames, particle dynamics, motion under central and electromagnetic force, effect of Earth's rotation, vibrations, work, kinetic and potential energy, dynamics of systems of particles. Prerequisite: ApSc 57. (Fall and spring)
- 113 Engineering Analysis I (3)** Esterling and Staff  
Analytical methods appropriate to the solution of engineering problems: applications of ordinary differential equations, matrices and determinants, eigenvalues and eigenvectors, systems of ordinary linear differential equations, Bessel and Legendre functions. Prerequisite or concurrent registration: Math 33. (Fall and spring)
- 114 Engineering Analysis II (3)** Kahn and Staff  
Analytical methods appropriate to the solution of engineering problems: complex variables, Fourier series and integral, orthogonal functions, Laplace transforms, partial differential equations in engineering and applied science. Prerequisite: ApSc 113. (Fall and spring)
- 115 Engineering Analysis III (3)** Soland and Staff  
Analytical methods appropriate to the solution of engineering problems using concepts from probability and statistics: random variables, distribution functions, mathematical expectation, point and confidence interval estimation, hypothesis testing, correlation, regression, and engineering applications. Prerequisite: Math 32. (Fall, spring, and summer)
- 116 Engineering Analysis IV (3)** Soland and Staff  
Analytical methods appropriate to the solution of engineering problems using advanced concepts from probability and statistics: multivariate distributions, expectation, generating functions, parametric families of distributions, sampling and sufficient statistics, estimation, hypothesis testing, and engineering applications. Prerequisite: ApSc 115, Math 33. (Fall and spring)
- 199 Honors Research Project and Seminar (3)** Staff  
Student designs and carries out a research project under the supervision of a faculty advisor. Students from all engineering disciplines meet periodically to present projects and discuss results. Enrollment limited to students admitted to the Honors Research Program. May be repeated for credit.

## ART

Professors D.H. Teller, L.F. Robinson, J.F. Wright, Jr., A.H. Smith, J.L. Lake, T. Ozdogan, M.P. Lader (Chair), C.C. Costigan  
 Professorial Lecturers Grace Evans, L. Miller  
 Associate Professors H.I. Gates, D.M. Hitchcock, J.C. Anderson, B. von Barghahn, S.B. Molina, W.T. Woodward, J.L. Stephanic, K.J. Hartswick  
 Adjunct Associate Professors Grose Evans, C.R. Rose  
 Associate Professorial Lecturers D. Srinivasan, J.G. Kauffman, A.B. Barnhart, B.G. Carson  
 Assistant Professors F. Griffith, D. Bjelajac, J.F. Harrop (Visiting)  
 Assistant Professorial Lecturers E.P. Lawson, M.J. Francis, B.R. Stevens, R. Rodriguez, J. Paradiso, M. Dennis, J.R. Spencer, M. Hasbun, S. Odland  
 Curator, Dimock Gallery L.D. Miller

*Bachelor of Arts with a major in art history*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Art 31–32 and 71 or 72.
3. Required courses in related areas—Art 137; Fren 1–2–3, or Ger 1–2, 3–4.
4. Required courses in the major—Art 101 and 102, 104 or 105, 106 or 107, 108, 109 or 110, 113 or 114, 117 or 118, 129; 9 additional credit hours in 100-level art history courses.
5. A maximum of 9 credit hours in fine arts, including Art 137, is permitted.

*Bachelor of Arts with a major in fine arts*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. A total of 51 hours of art courses is required of fine arts majors except for students



with a concentration in photography and visual communication, for whom 54 hours are required.

3. Required basic fine arts courses: Art 21-22 and 41-42.

4. Required courses in art history: Art 31-32; 6 additional credit hours in 100-level art history courses.

5. Required fine arts courses in the major:

a. 12 hours, exclusive of primary area of concentration, in four of the following eight areas—ceramics, advanced drawing, advanced design, printmaking, painting, photography, sculpture, and visual communication.

b. 15 hours to be taken in the primary area of concentration (except for photography and visual communication).

c. 18 hours for students concentrating in photography: Art 23, 24, 181, 182, 205, 206.

d. 18 hours for students concentrating in visual communication: Art 163, 164, and four courses chosen in consultation with the advisor.

6. Nine additional hours of electives may be taken in the Art Department, except for students concentrating in photography, who take only 6 hours of electives in the Art Department.

7. Transfer students must take at least 12 credit hours of 100-level fine arts courses and 9 credit hours in their area of specialization at this University.

*Bachelor of Arts with a combined major in art history and fine arts*—The following requirements must be fulfilled in consultation with the departmental advisor:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. A total of 30 hours in art history and 30 hours in fine arts.

a. Art history: Art 31-32, 71 or 72, and one course in each of the following areas—ancient, medieval, Renaissance, seventeenth and eighteenth centuries, nineteenth and twentieth centuries; 6 hours of art history electives.

b. Fine arts: Art 21-22, 41-42. The remaining 18 hours may be in one area of concentration or a combination of areas.

*Bachelor of Arts with a major in classical archaeology and anthropology*—An interdepartmental major offered by the Art and Anthropology Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Required courses in other areas: 6 credit hours, or equivalent, of introductory French, German, Latin, Greek, or a Near Eastern language. A second year of language study is strongly encouraged. Since graduate study in archaeology usually involves broader preparation, especially in languages, students intending to pursue graduate study should consult with the departmental advisor as early as possible.

3. Required courses in the major—Anth 3, 183-84, and one course chosen from Anth 152, 158, 177, or an approved 3-hour course in field work; four courses chosen from Art 101, 102, 103, 112, 155; two courses chosen from Clas 71, 72, 107, 113, 170; two courses chosen from Hist 107, 108, 109, 110 (students electing Hist 108 should previously have completed Hist 107 or 109).

*Bachelor of Arts with a major in classical archaeology and classics*—An interdepartmental major offered by the Art and Classics Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite courses—Clas 1-2, 3, 4; or Clas 11-12, 13-14.

3. Required courses in the major—Art 101, 102, 112, 155; three courses selected from Hist 107, 108, 109, 110, 209; 6 credit hours in second-group courses in Greek or Latin (a reading knowledge of French and German is recommended).

*Bachelor of Arts/Master of Arts in the field of art therapy*—A five-year program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. See Art Therapy in the Graduate Programs Bulletin.

*Special Honors*—For graduation with Special Honors, students must have attained a grade-point average of at least 3.5 in the major and 3.0 overall. No later than the beginning of the senior year, students should consult their advisor regarding eligibility and selection of an area of study and a director of the research or creative arts project.

*Minor in Art History*—Required: 18 credit hours of courses in art history. Declaration of the minor must be made after completion of no more than 9 hours in art history. Specific

areas of concentration (ancient/medieval, Renaissance/Mannerism, Baroque/eighteenth century, nineteenth century, modern, primitive/pre-Columbian, Hispanic) are determined upon consultation with the undergraduate advisor for Art History.

**Minor in Fine Arts**—Required: 18 credit hours of general course work in fine arts or in an area of concentration selected from design, drawing, ceramics, photography, painting, printmaking, sculpture, or visual communication. Students in the general program should consult the undergraduate fine arts advisor. Those selecting a specific area should consult with an advisor in the area of concentration.

**Combined Minor in Art History and Fine Arts**—Required: 9–12 hours of course work in art history and 9–12 hours in fine arts, for a total of 21 hours. Declaration of a combined minor must be made after completion of no more than 6 hours in art history and 6 hours in fine arts. A program of study is developed in consultation with the undergraduate advisors in art history and fine arts.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

## ART HISTORY

- 1 Principles of Art (3)** von Barghahn  
An introduction to various art media, basic elements of art and thematic interpretations, European and non-Western traditions. (Fall and spring)
- 31–32 Survey of Western Art (3–3)** Robinson and Staff  
A foundation for further study in the history of art. Art 31: prehistoric to Gothic art. Art 32: proto-Renaissance to modern art. (Art 31 and 32—fall and spring)
- 71 Introduction to the Arts in America I (3)** Bjelajac  
Painting, sculpture, and architecture from the Colonial period to the Civil War. Emphasis on the political and cultural problem of formulating a national style and iconography. Major focus on Washington public art and architecture. (Fall and spring)
- 72 Introduction to the Arts in America II (3)** Bjelajac  
Painting, sculpture, and architecture from the Realism of Homer and Eakins to feminist and postmodern art. Issues of the theory of an avant garde and government patronage and censorship. (Fall and spring)
- 101 Greek Art and Archaeology (3)** Hartswick  
A survey of Greek sculpture, painting, and architecture, from the Dark Ages (ca. 1000 B.C.) through Alexander the Great (ca. 300 B.C.). Emphasis is on the stylistic development of Greek art and the interrelationships among sculptural technique and style, major changes in vase painting, and the refinements of architectural elements. (Fall)
- 102 Roman Art and Archaeology (3)** Hartswick  
A survey of Roman sculpture, painting, and architecture, from 300 B.C. (the Etruscans) to the end of the Constantinian Period (ca. 300 A.D.). The major artistic achievements of the Romans—portraiture, historical narratives—and the stylistic changes from the idealized and illusionistic to the realistic and abstract. (Spring)
- 103 The Ancient Artist and His Workshop (3)** Hartswick  
A study of the ancient craftsman's techniques, workshop organization, and position in society. Exploration of sculpture, architecture, painting, pottery, mosaics, gems, glass, and metalwork.
- 104 Renaissance Art in Italy I (3)** Grace Evans  
Early developments from the 13th to the 15th century. (Fall)
- 105 Renaissance Art in Italy II (3)** Grace Evans  
High Renaissance and Mannerism. (Spring)
- 106 Renaissance Art in the North I (3)** Hitchcock  
Northern painting from van Eyck through Bosch. (Fall)
- 107 Renaissance Art in the North II (3)** Hitchcock  
Northern painting and graphics from Durer through Brueghel. (Spring)
- 108 18th-Century Art in Europe (3)** Hitchcock  
Painting, sculpture, and architecture in France, Great Britain, and Italy. Emphasis on Watteau, Chardin, David, Hogarth, Gainsborough, Reynolds, Canaletto, and Tiepolo. (Spring)



- 109 **19th-Century Art in Europe I (3)** Robinson  
Examination of Neoclassicism and Romanticism in the context of Western European political, social, and cultural developments. Emphasis on France, England, and Germany and the representative styles of David, Ingres, Delacroix, Turner, Constable, and Friedrich. (Fall)
- 110 **19th-Century Art in Europe II (3)** Robinson  
Examination of the revolution in style of Realism, Impressionism, and Post-impressionism in the context of Western European political, social, and cultural developments. Emphasis on representative styles of Courbet, Manet, Monet, Morisot, Degas, Seurat, Cezanne, Van Gogh, and Gauguin. (Spring)
- 111 **Classical Archaeology (3)** Hartswick  
Archaeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts.
- 112 **Egypt and the Near East (3)** Hartswick  
The great artistic tradition of the Nile Valley and the contemporary civilizations (ca. 3000 B.C. to after 1000 B.C.) between the rivers Tigris and Euphrates (present day Iraq) are explored. Emphasis on the Pyramid Age, the temples at Karnak and Luxor, the tombs of the Valley of the Kings, and the artistic traditions of the Sumerians, Akkadians, Babylonians, Assyrians, and Persians. (Fall)
- 113 **Baroque Art in Italy (3)** Grose Evans  
(Spring)
- 114 **Baroque Art in the North (3)** Hitchcock  
Concentration on France, Flanders, and Holland, with emphasis on Poussin, Rubens, Van Dyck, and Rembrandt. (Fall)
- 115 **Christian Iconography (3)** Grace Evans  
Origins and development of Christian symbols and themes from early Christian to the Council of Trent.
- 116 **Islamic Art (3)** Staff
- 117 **Medieval Art I (3)** Anderson  
Early Christian and Byzantine. (Fall)
- 118 **Medieval Art II (3)** Anderson  
Romanesque and Gothic. (Spring)
- 119 **Islamic Religion and Art (3)** Nasr  
Same as Rel 183.
- 120 **East Asian Art (3)** Srinivasan  
May be repeated for credit when content differs.
- 121 **Spanish Art I (3)** von Barghahn  
Discussion of areas selected from the art of ancient Iberia through the seventeenth century. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.
- 122 **Spanish Art II (3)** von Barghahn  
Discussion of areas selected from the eighteenth through twentieth centuries. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.
- 129 **20th-Century Art in Europe (3)** Lader  
Survey of 20th-century European painting, sculpture, and architecture, from their origins in the late 19th century through Surrealism. Emphasis on major modernist movements and artists, including Matisse, Picasso, Kandinsky, and Mondrian. (Fall)
- 130 **20th-Century American Art (3)** Lader  
Survey of 20th-century American painting and sculpture, focusing upon the avant garde. Emphasis on artists of the Stieglitz circle and later modernist movements such as Abstract Expressionism, Pop, Op, Minimal, and Conceptual art. (Spring)
- 140 **Gothic Architecture (3)** Staff
- 145 **Folk Arts in America (3)** Bjelajac  
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. Same as AmCv 145.
- 147 **Primitive Art I: Ancient Civilizations of Mexico and Latin America (3)** von Barghahn  
Survey of Pre-Columbian art and architecture from prehistoric period to the Spanish conquest, including Yucatan and Central American regions.

- 148 **19th-Century American Art I: Age of Democratic Revolution** (3) Bjelajac  
Contextual examination of painting and sculpture from the American Revolution to the Civil War, incorporating issues of national identity, democracy, religion, race and ethnicity, class and gender. (Fall)
- 149 **19th-Century American Art II: Origins of Modernism** (3) Bjelajac  
Painting, sculpture, and photography from the Civil War to the Alfred Stieglitz group and the Armory show. Issues of women in the arts, the Arts and Crafts movement, the formation of an American avant garde, and African-Americans in the arts. (Spring)
- 150 **Landmarks in American Art** (3) Bjelajac
- 155 **Aegean Civilizations** (3) Hartwick  
An introduction to the excavational and multidisciplinary aspects of classical archaeology. Minoan and Mycenaean civilizations (1700–1200 B.C.). Interrelationships between Greek and Persian cultures of the sixth and fifth centuries B.C. (Spring)
- 156 **Early Medieval Sculpture** (3) Grace Evans
- 161 **Studies in Renaissance Art** (3) Grace Evans
- 162 **Principles of Museum Work** (3) Lawson  
Introduction to the history and development of museums; problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service.
- 165 **Primitive Art II: African, Oceanic, North American Indian** (3) von Barghahn  
Survey of architecture, sculpture, and painting from ancient kingdoms to early 20th-century culture. Emphasis on imagery and iconography.
- 167 **The Dynastic Courts of Europe** (3) von Barghahn  
Politics and royal patronage, 1400–1800. Areas may include France, Italy, Spain, Portugal, Austria, Germany, or Russia. Specific area announced in *Schedule of Classes*. May be repeated for credit if specific area is different.
- 169 **History of Decorative Arts: European Heritage** (3) Carson  
Survey of changing styles of European furniture, textiles, ceramics, and glass, in the context of general trends in art history and changing patterns in economic, technological, social, and cultural history. From antiquity to the modern age (Fall)
- 170 **History of Decorative Arts: American Heritage** (3) Carson  
Examination of the decorative arts in America from the 17th century to the modern period. Exploration of changing visual characteristics in relation to the changing American experience. (Spring)
- 173 **History of the Cinema** (3) Staff  
Same as Comm 173. Laboratory fee, \$25.
- 176 **American Architecture** (3) Longstreth  
Same as AmCv/UPRE 175.
- 187 **Individualism, Reason, and Tradition in Early Modern Europe** (3) Kennedy  
Same as Engl/Fren/Ger/Hist/Rel 183.
- 191 **American Architecture** (3) Longstreth  
Same as AmCv/UPRE 176.
- 192 **The American Cinema** (3) Staff  
Same as AmCv 192.
- 197 **History of Photography** (3) Lader
- 198 **Studies in Art History** (3) Staff  
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

#### FINE ARTS

**Note:** Fine arts courses at the 100 level may be repeated for credit with approval of the department. Schedule of fees for Art 123–24: Ceramics—\$57; 2-D Design—\$24; 3-D Design—\$27; Drawing—\$75; Printmaking—\$36; Sculpture—\$27; Typography—\$54; Oil and Acrylic Painting—none; Watercolor—\$45; Photography—\$75; Visual Communication—\$54; Lithography—\$48; Serigraphy—\$54; Jewelry Design—\$36.



**21-22 Design I: Basic (3-3)**

Costigan, Teller

Required of all Fine Arts majors. Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. Art 21: Laboratory fee, \$24. Art 22: Laboratory fee, \$27. (Art 21 and 22—fall and spring)

**23 Photography I: Introduction (3)**

Lake and Staff

Introduction to the principles of exposure and development of films and papers. Emphasis on creative expression. Laboratory fee, \$75. (Fall and spring)

**24 Photography II (3)**

Stephanic

Continuation of Art 23. Experimentation with black and white films and developers. Improvement of printing and exposure techniques. Emphasis on control for creative expression. Prerequisite: Art 23. Laboratory fee, \$75. (Fall and spring)

**41-42 Drawing I (3-3)**

Wright and Staff

Elementary investigation of concepts of drawing, both traditional and contemporary; training in perception, analysis of form in light and space; instruction in the use of graphic materials and media; exercises in connoisseurship. Material and model fee, \$75 per semester. (Art 41 and 42—fall and spring)

**51 Introduction to Handbuilt Ceramics (3)**

Ozdogan and Staff

Working with clay as an art form. Exploration of pinch, coil, slab, hump and press mold, paddling, and hollowing techniques. Sketch studies, reduction and oxidation kiln firings, clay and glaze making. Laboratory fee, \$57, including unlimited materials and use of tools. (Fall and spring)

**52 Introduction to Wheelthrown Ceramics (3)**

Ozdogan and Staff

Development of cylindrical and open forms. Trimming, clay and glaze making, reduction and oxidation kiln firings. Sketch studies. Laboratory fee, \$57, including unlimited materials and use of tools. (Fall and spring)

**57 Printmaking: Introduction to Relief and Planographic Techniques (3)**

Griffith

Exploration in monochrome and color of basic methods of these techniques, i.e., woodcut, composite relief, monotype, and lithography. Emphasis on aesthetic qualities of prints. Laboratory fee, \$36. (Fall)

**58 Printmaking: Introduction to Intaglio and Stencil Techniques (3)**

Griffith

Exploration in monochrome and color of basic methods of these techniques, i.e., etching, engraving, collograph, stencil, and composite intaglio. Laboratory fee, \$36. (Spring)

**61-62 Water Color (3-3)**

Staff

Painting in transparent and opaque water color and in acrylic. Experimentation, figurative, and landscape. Laboratory fee, \$45 per semester. (Academic year)

**65-66 Painting I (3-3)**

A. Smith and Staff

Emphasis on personal expression with exposure to a variety of styles. Application of design principles to easel painting. Material and model fee, \$39 per semester. (Academic year)

**81-82 Sculpture I (3-3)**

Gates and Staff

Beginning study of design and fabrication of sculpture. Basic sculptural techniques for media, including clay, plaster, stone, and wood. Laboratory fee, \$27 per semester. (Academic year)

**123-24 Individual Problems (3-3)**

Staff

Emphasis on problems and materials of specific interest to the student in any area of Fine Arts. Laboratory fee depending on area chosen. Prerequisite: permission of instructor. (Academic year)

**125-26 Painting II (3-3)**

A. Smith

Alteration of personal expression and structured problems dealing with still life and the figure. Use of acrylic and oil. Material and model fee, \$39 per semester. (Academic year)

**127-28 Painting III (3-3)**

Woodward

Studies in the interpretation of the figure and still life. Emphasis on color, space, planes, modulations. Alla prima and mixed techniques. Material and model fee, \$39 per semester. (Academic year)

- 131 Intermediate Ceramics:** Ozdogan and Staff  
**Wheelthrown Functional Forms (3)**  
 Aesthetic and technical development of wheelthrown functional ceramic forms. Exploration of attachments: lids, spouts, handles, and footing devices. Sketches and technical drawings, clay and glaze-making tests, varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, \$57. (Fall and spring)
- 132 Intermediate Ceramics:** Ozdogan and Staff  
**Wheelthrown Nonfunctional Forms (3)**  
 Aesthetic and technical development of wheelthrown ceramic sculptural forms. Emphasis on section throwing, closed forms, and construction. Varied temperature firings in oxidation and reduction atmospheres. Clay and glaze making. Laboratory fee, \$57. (Fall and spring)
- 133 Ceramic Decoration (3)** Ozdogan  
 Aesthetic and technical development of surface decoration, with experimental projects in sgraffito, mishiima, engobe, majolica, underglaze, overglaze, and relief techniques. Laboratory fee, \$57. (Fall)
- 134 Nonsilver Printing Processes in Photography (3)** Smigrod  
 Introduction to nonsilver and archaic photographic processes. At least three processes will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$75. (Spring)
- 135-36 Advanced Water Color (3-3)**  
 Development of techniques of water color; concentration on special projects. Laboratory fee, \$45 per semester. (Academic year)
- 137 Workshop in Materials, Methods, and Techniques (3)** Woodward, A. Smith, and Staff  
 Technical investigation of painting methods from the 14th century to the present. Preparation of grounds, media, underpainting, glazing. Laboratory fee, \$15. (Fall and spring)
- 138 Printmaking: History and Practice (3)** Griffith  
 Lecture survey through slides and original prints of the history of the fine art etching, engraving, woodcut, stencil, and lithograph. Laboratory demonstrations with student participation. This basic course is designed for artists, art historians, art dealers, appraisers, librarians, commercial artists, and collectors. There is no prerequisite. Laboratory fee, \$24. (Summer)
- 139 Problems in Color (3)** Costigan  
 Intensive exploration of the subjective experience and objective rationale of color through the execution of problems in color contrast and color scale. Laboratory fee, \$18. (Spring)
- 141 Interior Design (3)** Teller  
 Survey of basic interior design materials and techniques. Topics include floor plans and design, interior renderings, hard and soft materials, furniture styles. Laboratory fee, \$21. (Fall)
- 142 Interior Design Problems (3)** Teller and Staff  
 A theoretical and practical in-depth exploration of a specific area of interior design selected from furniture design, construction and restoration, history of furnishings, and interior rendering. Topic to be announced in the *Schedule of Classes*. Prerequisite: Art 141 or equivalent. Laboratory fee, \$21. (Spring)
- 143-44 Serigraphy (3-3)** Teller  
 Fine Arts printmaking using serigraphic techniques. Utilization of all basic techniques; emphasis on aesthetic properties of prints. Laboratory fee, \$54 per semester. (Academic year)
- 146 Ceramic Restoration (3)** Ozdogan  
 Methods and techniques for museum and commercial application. Laboratory fee, \$57. (Summer)
- 151 Ceramic History and Technology (3)** Ozdogan and Staff  
 A survey of the history of ceramics and its technology. Lectures, demonstrations, and supplemental programs. Laboratory fee, \$21. (Fall)
- 152 Ceramic Sculpture (3)** Ozdogan  
 Developing an understanding of the sculptural ceramic form that integrates both quality and creativity. Techniques in hollow and solid construction. Varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, \$57. (Fall)



- 153 Printmaking: Intermediate Study of Intaglio and Relief Techniques (3)** Griffith  
Investigation in monochrome and color of these techniques, i.e., etching, engraving, woodcut, wood engraving, stencil, composite processes, and mixed media. Prerequisite: Art 57, 58. Laboratory fee, \$36. (Fall)
- 154 Printmaking: Introduction to Light-Sensitive Grounds (3)** Griffith  
Exploration of the use of grounds on copper that are sensitive to light for the purpose of etching. Printing in monochrome and color. Prerequisite: Art 153 or equivalent. Laboratory fee, \$36. (Spring)
- 157-58 Printmaking: Advanced Study of Intaglio and Relief Techniques (3-3)** Griffith  
Intensive exploration in monochrome and color of printmaking; etching, engraving, woodcut, wood engraving, stencil, collograph printing with light-sensitive grounds, composite techniques, and mixed media. Emphasis on utilization of techniques in developing a personal statement and style. Prerequisite: Art 153, 154, or equivalent. Laboratory fee, \$36. (Fall and spring)
- 159-60 Drawing II (3-3)** Wright and Staff  
Study and application of master drawing techniques. Investigation of perspective and anatomy. Emphasis upon conceptual development of personal style. Material and model fee, \$75 per semester. (Academic year)
- 163 Visual Communication I: Basic Layout (3)** Molina and Staff  
Layout stages, including basic formats, production processes; working with type and basic skills. Prerequisite: Art 171. Laboratory fee, \$54.
- 164 Visual Communication II: Problem Solving (3)** Molina and Staff  
Conceptual approach to problem solving. Various graphic design problems, including both small-format and large-format design in commercial and institutional graphics. Prerequisite: Art 163, 172. Laboratory fee, \$54.
- 166 Advanced Drawing Techniques (3)** A. Smith and Staff  
Specific area announced in the *Schedule of Classes*. May be repeated for credit if the area covered is different. Laboratory fee, \$75.
- 168 Intermediate Ceramic Design in Handbuilding (3)** Ozdogan  
Further concentration in handbuilding techniques of pinch, coil, slab, hump and press mold, paddling, and hollowing. Sketch studies, clay and glaze tests. Orientation to studio operations and maintenance. Laboratory fee, \$57. (Fall and spring)
- 171 Typography I (3)** Molina and Staff  
Basic calligraphy for traditional and contemporary use. Type theory, including specification, copy fitting, and study of letter form as used in graphic design. Laboratory fee, \$54.
- 172 Typography II (3)** Molina and Staff  
Study of type classification, recognition, and adaptation. Methods of type specification, copy fitting, and typesetting processes. Typographic layout and alphabet design. Prerequisite: Art 171. Laboratory fee, \$54.
- 174 Visual Communication III: Computer Graphics Seminar (3)** Molina and Staff  
Introduction to computer graphics for art majors. The use of computers in the design process and as a tool for problem solving in graphic design. Laboratory fee, \$54.
- 175 Printmaking: Introduction to Lithography (3)** Barnhart  
Study of planographic techniques and materials related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Laboratory fee, \$48.
- 177-78 Survey of Printing and Illustration (3-3)** Staff  
Exposure to a maximum range of illustrative processes, both practical and theoretical. Technical aspects of commercial printing processes; methods of preparation of artwork, photographs, and typographic proofs for commercial reproduction. (Academic year)
- 179-80 Sculpture II (3-3)** Gates  
Expansion of Sculpture I, utilizing advanced wood milling equipment and metal welding techniques. Prerequisite: Art 81-82. Laboratory fee, \$27.

- 181 Introduction to Color Photography (3)** Lake  
Introduction to color through exposure and processing of color transparency films. Use of filters for creating and correcting color shifts, with emphasis on color as subject matter. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$75. (Fall)
- 182 Introduction to Photographic Lighting (3)** Stephanie  
Introduction to various lighting techniques. Available light manipulation, studio lighting, and copy lighting will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$54. (Fall and spring)
- 183 Experimental Photography (3)** Staff  
Structured exploration of various photographic processes and techniques. Emphasis on creative expression. Content of course will vary; contact department for current offering. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$75. (Fall and spring)
- 184 Jewelry Design and Techniques (3)** Gates  
Laboratory fee, \$36. (Summer)
- 185-86 Portrait Painting and Drawing (3-3)** C. Smith  
Fall: Various media; drawing and pastel. Spring: Oil. Model fee, \$45 per semester
- 189-90 Sculpture III (3-3)** Gates  
Advanced study in concepts and materials through creation of three-dimensional forms concentrating on relevance of scale and media. Relationship of sculpture to the environment. Prerequisite: Art 179-80. Laboratory fee, \$27 per semester. (Academic year)
- 193 Film Making I (3)** Staff  
Introduction to the basic techniques and procedures for film making. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$54. (Fall and spring)
- 194 Film Making II (3)** Staff  
Continuation of Art 193 with more advanced projects. Prerequisite: Art 193 or permission of instructor. Laboratory fee, \$54. (Fall and spring)
- 195 Documentary Photography (3)** Staff  
Historical development of documentary photography. Completion of two projects required. Laboratory fee, \$75. Prerequisite: Art 23 and 24 or permission of instructor. Same as Jour 195. (Fall)

## ASTRONOMY

See Physics.

## BIOLOGICAL SCIENCES

Professors S.O. Schiff, D.L. Atkins, R.K. Packer (Chair), R. Donaldson

Professorial Lecturer R.P. Eckerlin

Associate Professors R.E. Knowlton, H. Merchant, T.L. Hufford, D.E. Johnson, J.R. Burns, K.M. Brown, D.L. Lipscomb

Associate Professorial Lecturer P.E. Spiegler

Assistant Professors E.F. Wells, H.B. Wagner, D.W. Morris

*Bachelor of Arts with a major in biology*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses—BiSc 11-12, or equivalent.
3. Chem 11-12; Chem 151-52 and 153-54, or Chem 50. (The following courses are strongly recommended: Phys 1, 2, 5, and 6; 3 credit hours of either mathematics or statistics; 2 years of French, German, or Russian.)
4. (a) Required courses for the major—A minimum of 24 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biology, suborganismal biology, organismal biology, and ecology and evolution.

*Bachelor of Science with a major in biology*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses—BiSc 11-12, or equivalent.



3. Required courses in related areas—Chem 11–12; Chem 151–52 and 153–54, or Chem 50; Phys 1, 2, 5, and 6; 3 credit hours of either mathematics or statistics (this requirement cannot be satisfied by waiver). Two years of French, German, or Russian are strongly recommended but not required.

4. (a) Required courses for the major—A minimum of 30 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biology, suborganismal biology, organismal biology, and ecology and evolution.

A maximum of 6 credit hours of research and independent study or graduate courses in biological sciences may be used as electives within the major.

**Special Honors**—In addition to the general requirements stated under Regulations, in order to be considered for graduation with special honors, a student must maintain a cumulative 3.5 grade-point average in biological science courses and at least a 3.0 cumulative overall grade-point average.

**Minor in biology**—12 credit hours of 100-level courses (excluding research and independent study).

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Biological sciences course offerings have been restructured, and most courses have been renumbered.

**Departmental prerequisite:** BiSc 11–12 or equivalent is prerequisite to all 100-level courses except by permission of the instructor.

## INTRODUCTORY BIOLOGY

### 3–4 Introductory Biology for Nonscience Majors (3–3)

Schiff

Lecture (2 hours), laboratory (2 hours). BiSc 3: Principles of cell biology; structure and function of plants and animals; animal behavior. BiSc 4: Human anatomy and physiology; genetics; evolution; ecology. Prerequisite to BiSc 4: BiSc 3. Laboratory fee, \$35 per semester. (Academic year)

### 11–12 Introductory Biology for Science Majors (4–4)

Hufford

Lecture (3 hours), laboratory (3 hours). BiSc 11: Principles of cell and molecular biology, cell physiology, inheritance, and evolution. BiSc 12: Principles of organismal biology, including diversity, form and function of plants and animals, and ecology. Prerequisite to BiSc 12: BiSc 11. Laboratory fee, \$45 per semester. (Academic year)

## CELL AND MOLECULAR BIOLOGY

### 102 Cell Biology (3)

Morris

Structure and function of biological molecules, viruses, and cellular organelles. Prerequisite: one semester of organic chemistry. (Spring)

### 103 Cell Biochemistry (3)

Donaldson

Introduction to the metabolism of generalized cells of animals, plants, and microorganisms, including energetics, enzymes, respiration, biosyntheses, and regulatory mechanisms. Prerequisite: one semester of organic chemistry. (Fall)

### 104 Cell Biochemistry Laboratory (2)

Donaldson

Designed to illustrate some of the principles and techniques of biochemical experimentation. Prerequisite or concurrent registration: BiSc 103. Laboratory fee, \$45. (Fall)

### 107 Genetics (3)

Johnson

Introduction to genetics, with emphasis on the integration of transmission of genetic traits and the chemical basis of gene action. Also includes cytogenetics, gene regulation, and examples of current applications of genetic technology. (Fall and spring)

### 108 Genetics Laboratory (1)

Johnson

Study of genetic principles using *Drosophila*, *E. coli*, and lambda phage. Prerequisite or concurrent registration: BiSc 107. Laboratory fee, \$45. (Fall and spring)

**109 Advanced Genetics (3)**

Johnson

Emphasis on the use of genetic analysis in solving modern biological problems. Prerequisite: introductory course in genetics. (Spring)

**SUBORGANISMAL BIOLOGY****110 Developmental Plant Anatomy (4)**

Hufford

Demonstration, observation, discussion (6 hours). Initiation and ontogeny of tissues and organs of vascular plants. Laboratory fee, \$45. (Spring, odd years)

**112 Plant Physiology (4)**

Donaldson

Lecture (2 hours), laboratory (4 hours). Physiology of seed plants with emphasis on growth, development, tropisms, and reproduction. Prerequisite: Chem 11-12. Recommended: Chem 50 or 151-52. Laboratory fee, \$45. (Spring)

**114 Principles of Development (4)**

Brown

Lecture (2 hours), laboratory (4 hours). Development of animals, especially vertebrates, with reference to human embryos. Principles are illustrated by modern experimental studies of developmental problems. Laboratory analysis of organ system formation in the frog, chick, and pig. Laboratory fee, \$45. (Fall)

**115 Experimental Developmental Biology (4)**

Brown

Lecture (2 hours), laboratory (4 hours). Molecular and cellular biology of development. Laboratory exercises involve micromanipulative and biochemical operations on embryos fertilized in the lab. Prerequisite: BiSc 114 or equivalent, or permission of instructor. Recommended: a course in cell biology. Laboratory fee, \$45. (Spring)

**118 Histology (4)**

Burns

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Laboratory fee, \$45. (Spring)

**120 Survey of Neurobiology (4)**

Atkins

Lecture (3 hours), laboratory (2 hours). Study of the gross and cellular anatomy, physiology, and biochemistry of the nervous system and its pathways; emphasis on mammals. Laboratory fee, \$45. (Fall)

**121 Comparative Endocrinology (4)**

Burns

Lecture (3 hours), laboratory (2 hours). Comparative study of basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. Prerequisite: BiSc 124, 132 and/or concurrent registration in Chem 151-52 or 50. Laboratory fee, \$45. (Fall)

**122 Human Physiology (3)**

Packer

Introduction to the function of organ systems of the human body. Prerequisite: Chem 11-12. (Fall)

**123 Human Physiology Laboratory (1)**

Staff

Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 122. Laboratory fee, \$45. (Fall)

**124 Advanced Human Physiology (4)**

Packer

Lecture (3 hours), laboratory (3 hours). Detailed study of selected organ systems stressing chemical and physical bases. Prerequisite: BiSc 122 and 123, or equivalent. Prerequisite or concurrent registration: Chem 151-52 or 50. Laboratory fee, \$45. (Spring)

**126 Radiation Biology (3)**

Schlitt

Chemical, physical, and biological aspects of radiation; effects of radiation on cells and organisms, with emphasis on mammals. Recommended: cell biology and chemistry or physics. (Fall)

**128 Human Nutrition (3)**

Staff

Dietary requirements and their underlying physiological and biochemical bases; composition of natural and modified foodstuffs and additives; social and economic aspects of nutrition. (Spring)

**ORGANISMAL BIOLOGY****130 Invertebrate Zoology (4)**

Knowlton

Lecture (3 hours), laboratory (3 hours). General survey of invertebrate animals including classification, morphology, physiology, embryology, and evolutionary relationships among phyla. Laboratory fee, \$45. (Fall)



- 132 Comparative Vertebrate Anatomy (4)** Atkins  
Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of Phylum Chordata, stressing recent forms. Laboratory fee, \$45. (Fall)
- 134 Field Botany (4)** Wells  
Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on local flora. Because of conflicting field-trip schedules, concurrent registration in BiSc 155 is not allowed. Laboratory fee, \$45. (Fall; may be repeated for credit during the summer)
- 135 Plant Diversity (4)** Wagner  
Demonstration, observation, discussion (6 hours). Evolutionary morphology and life histories as a basis for a phylogenetic study. Laboratory fee, \$45. (Spring, odd years)
- 137 Introductory Microbiology (4)** Morris  
Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and economic importance. Prerequisite: one year of chemistry. Laboratory fee, \$45. (Fall)
- 138 Protistology (4)** Lipscomb  
Lecture (2 hours), laboratory (4 hours). Examination of the diversity, evolution, morphology, physiology, ecology, and reproduction of both photosynthetic and heterotrophic protists. Laboratory fee, \$45. (Spring, even years)
- 139 Parasitology (4)** Eckerlin  
Lecture (2 hours), laboratory (4 hours). Introduction to animal parasitology; survey of parasitic types from protozoa through arthropods. Laboratory fee, \$45. (Fall)
- 140 Taxonomy of Flowering Plants (4)** Wells  
Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary development, and principles of systematics of flowering plants. Laboratory fee, \$45. (Spring)
- 142 Flora of the Mid-Atlantic States (4)** Wells  
Field trips and laboratory study of the identification and ecology of vascular plants of the Coastal Plain, Piedmont, and mountains of Delaware, Maryland, Virginia, and West Virginia. Emphasis on family characteristics and recognition of dominant species in native habitats. Weekend trips required. Laboratory fee, \$45. (Summer)
- 145 Ornithology (4)** Wagner  
Lecture (2 hours), laboratory and field (4 hours). An introduction to the study of birds from an ecological perspective. Includes several short field trips, two full-day Saturday trips for waterfowl and migrants, and one evening field trip for owls. Laboratory fee, \$45. (Spring, even years)

## ECOLOGY AND EVOLUTION

- 150 Organic Evolution (3)** Lipscomb  
Synthetic theory of organic evolution, including population biology, speciation, adaptation, macroevolution, systematics, biogeography, and an overview of the course of evolution from prebiotic Earth to the emergence of man. (Fall)
- 152 Animal Behavior (3)** Wagner  
An evolutionary approach to the study of animal behavior, emphasizing behavioral ecology and sociobiology. (Spring)
- 154 General Ecology (4)** Merchant  
Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer and their relationship to the structure and function of population, species, communities, and ecosystems. Laboratory fee, \$45. (Fall)
- 155 Plant Ecology (4)** Wagner  
Lecture (2 hours), laboratory (4 hours). Introduction to the dynamics of plant populations, communities, and individuals. One weekend field trip required. Because of conflicting field-trip schedules, concurrent registration in BiSc 134 is not allowed. Laboratory fee, \$45. (Fall)
- 156 Animal Ecology (4)** Merchant  
Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: BiSc 154 or permission of instructor. Laboratory fee, \$45. (Spring, even years)

- 157 Aquatic Ecology (4)** Merchants  
Lecture (3 hours), laboratory and field (3 hours). Principles applied to aquatic systems with special references to physiochemical properties, typical habitats, and communities. Laboratory fee, \$45. (Spring, odd years)
- 167 Marine Biology (4)** Knowlton  
Lecture (2 hours), laboratory and field (4 hours), plus some extended field trips. Study of relationships between organisms and physical, chemical, and biological factors of the marine environment. Consideration of the open ocean and coastal ecosystems and man's influence on them. Laboratory fee, \$45. (Spring)
- 168 Tropical Marine Biology (4)** Knowlton, Packer  
Study of relationships between organisms and physical, chemical, and biological factors in a tropical marine-estuarine environment, conducted through ecological fieldwork in characteristic tropical ecosystems on the island of San Salvador, Bahamas. Laboratory investigations on organism physiology. Recommended: BiSc 122 and/or 130. Laboratory fee, \$45. (Summer, even years)
- 169 Applied Marine Ecology (4)** Knowlton  
Field study of interactions among biotic and abiotic components of temperate-boreal ecosystems, with emphasis on man's impact and utilization of coastal resources, conducted through surveys of ecosystems along the Maine coast. Ecological and oceanographic research techniques. Recommended: BiSc 130 and/or 167. Laboratory fee, \$65. (Summer, odd years)

#### RESEARCH AND INDEPENDENT STUDY

- 171 Undergraduate Research (arr.)** Staff  
Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 50 or 152; 16 credit hours in biological sciences courses. Laboratory fee, \$40 per credit hour. (Fall and spring)
- 172 Independent Study in Cell and Molecular Biology (2)** Donaldson, Morris  
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor. (Fall and spring)
- 173 Independent Study in Developmental Biology (2)** Brown, Burns  
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor. (Fall and Spring)
- 174 Independent Study in Organismic Biology (2)** Knowlton, Wagner, Wells  
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor. (Fall and spring)
- 175 Independent Study in Genetic and Evolutionary Biology (2)** Johnson, Lipscomb  
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor. (Fall and spring)
- 176 Independent Study in Environmental Biology (2)** Hufford, Merchants  
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor. (Fall and spring)

#### CHEMISTRY

Professors T.P. Perros, W.E. Schmidt, D.G. White, J.B. Levy, N. Filipescu, E.A. Caress, D.A. Rowley, D. Ramaker (Chair), M. King, A. Montaser  
Associate Professor J.H. Miller  
Assistant Professors D. DiLella, D.L. Sedney (Research), C.A. Crichlow (Visiting)  
Instructor J. Hilderbrandt  
Lecturer A. Herner

Bachelor of Arts or Bachelor of Science with a major in chemistry—The department offers two undergraduate majors, both designed to give students a broad background in the basic divisions of chemistry: analytical, inorganic, organic, and physical. Major I, while providing considerable concentration in chemistry, permits a wider selection of electives



It thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. Major II is intended primarily for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified by the American Chemical Society as having met the minimum requirements for professional training. Students planning to do graduate work in chemistry may consider taking one foreign language (Russian, Japanese, German, or French).

The following requirements must be fulfilled:

1. Students in either Major I or Major II must meet the general requirements stated under *Columbian College of Arts and Sciences*.
2. Prerequisite courses for the Bachelor of Arts degree for Major I and Major II—Chem 11–12 or 17–18; Chem 22 and 23; required courses in related fields—Math 31, Phys 21–22. **Bachelor of Science degree candidates must also take BiSc 11–12 or a year of other approved course work in the natural sciences or mathematics.**
3. (a) Required courses for Major I—Chem 111–12, 113, 122, 134 or 235, 141, 151–52, and 153–54.  
(b) Required courses for Major II—Chem 111–12, 113, 122, 123, 141–42, 151–52, 153–54, 235; one approved advanced course in chemistry or a related field. Required courses in related fields for Major II—Math 32 and a course in a structured computer programming language, such as Stat 129 or CSci 51.

An entering student who is considering chemistry as a major is strongly encouraged to consult the Chemistry Department advisor regarding the program of study for the first two years. In general, the following sequence of courses is recommended for those students considering Major II: first year—Chem 11–12 or 17–18, Math 31 and 32 (or 30 and 31 if necessary), English composition, electives; second year—Chem 22 and 23, 151–52, and 153–54, Phys 21–22, Math 32 if not taken in first year, electives; third year—Chem 111–12, 113, and 141, computer programming, electives; fourth year—Chem 122, 123, 235, 142, one advanced course in chemistry or a related field, electives. Major I students should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic programs.

**Special Honors**—In addition to meeting the general requirements stated under Regulations, a candidate for graduation with Special Honors in chemistry must maintain a cumulative 3.0 grade-point average in chemistry courses and take Chem 195 for at least 3 credits over two semesters.

**Bachelor of Science/Master of Science in the field of chemical toxicology**—A five-year program leading to the B.S. in the field of chemistry and M.S. in the field of chemical toxicology. See *Forensic Sciences in the Graduate Programs Bulletin*.

**Minor in Chemistry**—Required: Chem 11–12 or 17–18, 22 and 23, 50, and 110 or 111; Chem 151–52 and 153–54 may be substituted for Chem 50.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the *Graduate Programs Bulletin* for course listings.

**Note:** Upon consultation with course instructors, specific course prerequisites may be waived. Chem 11–12, 13, and 17–18 are related in their subject matter, and credit for only one of these sets of courses can be earned toward a degree.

## PHYSICAL SCIENCE

### 3–4 Contemporary Science for Nonscience Majors (3–3)

Filipescu

Contemporary topics in physical, biological, and medical science. Chem 3 is not prerequisite to Chem 4. Laboratory fee, \$30 per semester. (Academic year)

## CHEMISTRY

### 11–12 General Chemistry (4–4)

Perros, Rowley, White

Atomic structure and properties; stoichiometry; gas, liquid, and solid state; chemical bonding; solutions; chemical kinetics and equilibria; thermodynamics; acids and bases; electrochemistry; descriptive chemistry. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, \$40 per semester. (Chem 11 and 12—fall and spring)

- 13 General Chemistry (4)** White  
For engineering students only. Stoichiometry; atomic structure and chemical bonding; gases, liquids, and solids; oxidation-reduction and acid-base reactions; thermochemistry; chemical equilibrium; electrochemistry. Prerequisite of concurrent registration: Math 31, Phys 14. Laboratory fee, \$40. (Fall)
- 17-18 Advanced General Chemistry (4-4)** Rowley  
Equivalent to Chem 11-12, but with selected topics studied in depth. Additional topics may include environmental chemistry, biochemistry, and industrial chemistry. Prerequisite to Chem 17: one year each of high school chemistry (with laboratory) and algebra; a course in trigonometry. Prerequisite to Chem 18: Chem 17. Laboratory fee, \$40 per semester. (Academic year)
- 22 Introductory Quantitative Analysis (3)** Schmidt  
Theory and practice of quantitative analysis by modern methods; evaluation of analytic data emphasizing detection and correction of experimental errors. Correlated with Chem 23. Prerequisite: Chem 12, 13, or 18. (Fall)
- 23 Introductory Quantitative Analysis Laboratory (2)** Schmidt and Stal  
Laboratory complement to Chem 22. Prerequisite or concurrent registration Chem 22. Laboratory fee, \$40. (Fall and spring)
- 50 Introduction to Organic Chemistry (4)** Caress, King  
Lecture (3 hours), laboratory (3 hours). A one-semester course for students in other disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Credit may not be earned for both Chem 50 and Chem 151-52. Prerequisite: Chem 12 or 18. Laboratory fee, \$40 (Spring)
- 105 Environmental Chemistry (3)** Miller  
Chemistry and physics of the environment, with emphasis on water and air pollution. Environmental analysis and modeling and their limitations. (Fall)
- 110 Introduction to Physical Chemistry (3)** Ramakrishna  
Gas, solid, and liquid state, chemical thermodynamics, solutions, chemical equilibrium, kinetics, quantum chemistry, spectroscopy, and macromolecules. Prerequisite: Chem 22 and 23; Math 31; Phys 2 or 22; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111-12 or an equivalent course.
- 111-12 Physical Chemistry (3-3)** Miller, Ramakrishna  
Gas laws, chemical thermodynamics, chemical equilibrium, kinetics, quantum chemistry, atomic and molecular spectra, structure of solids, liquids, and macromolecules. Prerequisite to Chem 111: Chem 22 and 23; Math 31; Phys 22; or permission of instructor. Prerequisite to Chem 112: Chem 111. (Academic year)
- 113 Physical Chemistry Laboratory (2)** Miller, DiLello  
Laboratory complement to Chem 111. Prerequisite or concurrent registration Chem 111. Laboratory fee, \$40. (Spring)
- 122 Instrumental Analytical Chemistry (3)** Montague  
Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, with emphasis on atomic and molecular spectrophotometry, infrared spectroscopy, nuclear magnetic resonance, mass spectrometry, chromatography, and electroanalysis. Correlated with Chem 123. Prerequisite or concurrent registration: Chem 111 or permission of instructor. (Fall)
- 123 Instrumental Analytical Chemistry Laboratory (2)** DiLello  
Laboratory complement to Chem 122. Prerequisite or concurrent registration Chem 111 and 122. Laboratory fee, \$40. (Fall)
- 134 Descriptive Inorganic Chemistry (2)** Stal  
Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 22, 23, and 152. (Spring)
- 141 Experimental Chemistry (3)** White, Caress, King  
Experimental methods common to all disciplines of chemistry. Use of the chemical literature; operation of chromatographic and spectroscopic instrumentation; interpretation of spectra by correlation methods. Prerequisite: Chem 154. Laboratory fee, \$40. (Fall and spring)
- 142 Advanced Experimental Chemistry (2)** White, Caress, King  
Advanced laboratory techniques. Emphasis on individual work and on sophisticated laboratory procedures for preparation, separation, and characterization of



compounds and determination of their physical properties. Prerequisite: Chem 111 and 141. Laboratory fee, \$40. (Spring)

- 151-52 **Organic Chemistry** (3-3) Caress, Levy, King  
Systematic treatment of the structure, preparation, properties, and reactions of the principal classes of organic compounds. Fundamental principles of stereochemistry, reaction mechanisms, and spectroscopic methods of analysis. Credit may not be earned for both Chem 50 and Chem 151-52. Prerequisite to Chem 151: Chem 12 or 18. Prerequisite to Chem 152: Chem 151. (Academic year)
- 153-54 **Organic Chemistry Laboratory** (1-1) Staff  
Laboratory complement of Chem 151-52. Introduction to and practice in basic skills of synthesis, separation, and purification of organic compounds. Prerequisite or concurrent registration: Chem 151-52. Prerequisite to Chem 154: Chem 153. Laboratory fee, \$40 per semester. (Academic year)
- 156 **Qualitative Organic Analysis** (3) King  
Separation of mixtures such as essential oils and peptides; identification of their components using spectroscopic techniques. Lecture emphasizes the practical considerations in separation methods (including GLPC, TLC, and HPLC). Prerequisite: Chem 154. Laboratory fee, \$40. (Spring, odd years)
- 181 **History of Chemistry** (2 or 3) Perros  
Historical development of chemistry from antiquity to the 20th century. Prerequisite: Chem 12. (Fall)
- 193 **Chemical Instrumentation** (3) Montaser  
Electronic analog measurements and control of electrical quantities in chemical instrumentation; digital and analog data conversion and optimization of electronic measurements in chemical instrumentation; computer interfacing and programming using PC-based systems. Prerequisite: Chem 112 and 123. Laboratory fee, \$20. (Fall)
- 195 **Undergraduate Research** (1 or 2) Staff  
Research on problems approved by the staff. Approval must be obtained prior to registration. A final written report on the work is required. For students requesting Special Honors in chemistry, a poster or oral presentation is also required. May be repeated once for credit. Majors are encouraged to take the course for two semesters. Laboratory fee, \$40 per semester hour. (Fall and spring)

## CHINESE

See East Asian Languages and Literatures.

## CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

Professors H. Liebowitz, J.E. Feir, T.G. Toridis, J. Eftis, R. Goulard, K. Mahmood, A.M. Kiper (Chair), M.K. Myers, J.-N. Yang, R.E. Kaufman, D.M. Esterling, C.M. Gilmore, J.L. Whitesides, T.P.G. Liverman, V. Klein, D.L. Jones, B.M. Kramer, C.A. Garriss, J.C. Lamb III, G.D. Walberg (Research), J.D. Lee  
Adjunct Professors W.P. Reid, M.P. Gaus, B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, A.G. Adamantiades, M. Yachnis, C.F. Scheffey, B. Dendrou  
Professorial Lecturers N.L. Basdekas, D.R. Levin, W.D. Erickson, G.D. Love, S.-C. Liu, T.-F. Zien, D.J. Michel, W.D. Jackson, B. Miller, E.F. Skelton, C.J. Astill, P.D. Maycock, J.C. Hardin, R.H. Tolson, J. Sobieski, D.U. Gubser, J.I. Bregman, E. McCafferty, R.C. Macon, P.S. Lam, E.C. Yates, Jr., C. Ng, W.J. Boettinger, G.C. Everstine, J.A. Sprague, R.W. Barnwell, D.L. Dwoyer, F. Farassat, C.G. Interrante, A. Kehnemui, T. Kusuda, C.R. Hauer, D.W. Coder, D.R. Mulville, J.P. Raney, D.R. Levin  
Associate Professors M.I. Haque, E.T. Moyer, Jr., R. Löhner (Research), S. Sarkani  
Adjunct Associate Professor M.A. Imam  
Associate Professorial Lecturers D.W. Ellison, R.Y.-Y. Ting, M.C. Cullingford, F.L. Willingham, Jr., A.B. Wardlow, Jr., M.M. Mikulas, Jr., J.C. Coolbaugh, K. Khozeimeh, R.L. Bowles, W.D. Burrows, C. Winklehaus, R.F. Jones, Jr., S.C. Mehrotra, S. Basu, I.S. Raju, R. Chung, S.M. Joshi, R.E. Lindberg, Jr., T.A. Zang, Jr., S.L. Zimmerman, C.C. Frantz, A. Ghamarian, J.F. O'Dea, W.B. Fichter, L.B. Garrett, P.N. Majumdar, J.N. Moss, G.L. Smith  
Assistant Professors M.I. Anjum (Visiting), A.D. Cutler (Research)  
Assistant Professorial Lecturers R.C. Montgomery, R. Lee, T.L. Walton, Jr., G.E. Hicho, M.P. Gottlieb, W. Kulyk, E.T. Von Briesen, N.F. Knight, Jr., J.M. Luckring, K.G. Garrahan, A.L. Winsenbacher, H. Biswas, A.A. Oni, S.H. Yang, R.P. Weston

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science (Civil Engineering) and Bachelor of Science (Mechanical Engineering).

### CIVIL ENGINEERING

- 117 Engineering Computations (3)** Toridis and Stal  
Application of numerical methods to the solution of engineering problems. Reduction of physical and engineering systems to computer models. Optimization techniques, physical modeling. Emphasis on use of small-scale computing systems. Prerequisite: CSci 51 and junior status. (Fall)
- 120 Introduction to the Mechanics of Solids (3)** Stal  
Stress and strain, axial load problems, torsion, shear force and bending moment, pure bending of beams, shearing stresses in beams, compound stresses, analysis of plane stress and plane strain, combined stresses, deflection of beams, statically indeterminate problems, columns, the energy methods. Prerequisite: ApSc 51113. (Fall and spring)
- 121 Structural Theory I (3)** Toridis and Stal  
Theory of statically determinate structures; stability and determinacy; influence lines and moving loads. Analysis of roof systems and cable structures. Calculation of deflections. Approximate methods of analysis of indeterminate structures. Prerequisite or concurrent registration: CE 120. (Fall)
- 122 Structural Theory II (3)** Toridis and Stal  
Theory of statically indeterminate structures using matrix methods and classical approaches such as moment distribution and slope-deflection; influence line energy methods. Prerequisite: CE 121. (Spring)
- 140 Materials Science (3)** Gilmore and Stal  
Metallic, covalent, and ionic bonding; crystal structure; imperfections; noncrystalline solids; reaction rates; phase transformations, mechanical properties, electrical conduction; metals, insulators, semiconductors; magnetism; optical properties. Prerequisite: Chem 13; concurrent registration: Phys 16. (Fall and spring)
- 166 Materials Engineering (2)** Gilmore and Stal  
Mechanical properties, plastic deformation, dislocation theory, yielding, strengthening mechanisms, microstructure and properties, heat treatment of steel, composites, amorphous materials, viscoelastic deformation, creep, fracture, fatigue, fatigue crack propagation. Prerequisite: CE 140; concurrent registration: CE 120. (Fall and spring)
- 167 Mechanics of Materials Laboratory (1)** Gilmore and Stal  
Measurement of strains and study of failure resulting from applied forces in ductile, brittle, anisotropic, elastomeric, plastic, and composite materials. Study of tension, compression, bending, impact, and shear failures. Prerequisite or concurrent registration: CE 166. (Fall and spring)
- 168 Introductory Soil Mechanics (3)** Stal  
Engineering properties of soils; analysis of lateral earth pressures, bearing capacity, foundations, and slope stability. Prerequisite: CE 120, ME 126. (Fall)
- 182 Foundation Engineering (2)** Stal  
Subsurface exploration, design of shallow foundations, design of pile foundations, earth-retaining structures, professional ethics applications. Prerequisite: CE 168. (Spring)
- 185 Soil Mechanics and Foundation Engineering Laboratory (1)** Stal  
Laboratory experiments for the classification, strength, compressibility, and general engineering properties of soils. Prerequisite: CE 168. (Spring)
- 190 Contracts and Specifications (2)** Stal  
Law of contracts, construction contracts, specifications, bidding, insurance and bonds, professional liability, arbitration of disputes, litigation. (Fall)
- 191 Metal Structures (3)** Toridis and Stal  
Principles of the design of metal structures, structural elements, connections, specific problems of analysis, methods of construction, professionalism in design. Prerequisite: CE 122. (Fall)
- 192 Reinforced Concrete Structures (3)** Toridis and Stal  
Principles of the design of reinforced concrete structures. Details of reinforcement of structural elements. Monolithic structures, precast elements, methods



construction. Prerequisite: CE 121; or concurrent registration: CE 122. (Spring)

**193 Hydraulics (3)**

Mahmood and Staff

Fluid statics: pressure forces, buoyancy, and flotation. Application of kinematic principles; flow fields, stream tubes, and flow nets. Fluid dynamics: applications to pipe flow, hydraulic models, measurement of pressure, and velocity. Open channel flow: applications to water resources engineering. Prerequisite: ME 126. (Spring)

**194 Environmental Engineering I:**

**Water Resources and Water Quality (3)**

Lamb and Staff

Introduction to available water resources and their uses. Methods of evaluating water quality; causes and effects of quality, including impact on human health and aquatic life. Regulatory concepts and practices. Municipal water and wastewater systems. Course requirements include four periods of laboratory work. Prerequisite or concurrent registration: CE 193. (Fall)

**195 Hydrology (3)**

Staff

Descriptive hydrology: hydrologic cycle, precipitation, stream flow, evaporation, and transpiration. Quantitative hydrology: hydrograph analysis, hydrographs of basin outflow, storage routing. Probability concepts in hydrology: flood frequency, rainfall frequency, stochastic hydrology. Prerequisite or concurrent registration: ApSc 115, ME 126, CE 193. (Fall)

**196 Design and Cost Analysis of Civil Engineering Structures (3)**

Toridis and Staff

Total structural systems concepts. Design of civil engineering structures such as piers, wharves, bulkheads, offshore platforms, dams, and other special structures. Principles of cost analysis for timber, steel, and reinforced concrete structures. Prerequisite: senior status. (Spring)

**197 Environmental Engineering II:**

**Water Supply and Pollution Control (3)**

Lamb and Staff

Water sources and their development. Water distribution and wastewater collection systems, including applied hydraulics of pipelines and pumps. Physical, chemical, and biological treatment of water and wastewater. Planning to meet quality needs and regulatory requirements. Course requirements include four periods of laboratory work. Prerequisite: CE 194. (Spring)

**198 Research (1 to 3)**

Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## MECHANICAL ENGINEERING

**117 Engineering Computations (3)**

Esterling and Staff

Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Computer applications. Prerequisite: CSci 50. (Fall)

**120 Methods of Engineering Experimentation (2)**

Jones and Staff

Acquisition and analysis of experimental data. Laws of modeling and simulation. Report formulation and presentation. Basic principles of measuring instruments and sensors. Fundamentals of digital data acquisition and use of computer-based data systems. Strain gages, oscilloscopes, transducers, and computerized data systems. Prerequisite: ME 117. (Spring)

**126 Fluid Mechanics I (3)**

Garris and Staff

Fluid properties, fluid statics, integral and differential formulations of conservation of mass, momentum, and energy. Bernoulli's equation. Dimensional analysis and similitude. Inviscid flow. Viscous flow. Experimental and computational methods in fluid mechanics. Prerequisite: ApSc 58. (Spring)

**131 Thermodynamics (3)**

Staff

Fundamental thermodynamic concepts. Zeroth law of thermodynamics, work and heat, first law of thermodynamics, properties of pure substances, first-law analysis, second law of thermodynamics, reversibility, entropy, second-law analysis of thermodynamic systems. Prerequisite: ApSc 113, Phys 14. (Fall)

**134 Introduction to Vibration Analysis (3)**

Garris and Staff

Natural frequencies, free vibration, forced vibration. Unbalance, whirling, vibration isolation. Measuring techniques and application of computers in vibration

- analysis. Multiple degrees of freedom. Dynamic vibration absorbers. Shock and transient vibration. Prerequisite: ApSc 58. (Fall)
- 149 **Thermal Systems Design (3)** Kiper and Sta  
Completion of a thermal systems design project that requires integration of the engineering science background, economics, reliability, safety, ethics, professional responsibility, and social considerations. Work includes development and use of design methodology, optimization, feasibility considerations, detailed system descriptions, and presentation of results. Prerequisite: ME 187. (Fall)
- 152 **Mechanical Engineering Laboratory(2)** Garriss and Sta  
Project-oriented course. Simulates working environment of professional engineers. Projects are assigned in student's areas of interest; student is expected to design and assemble own experiments. Extensive use of instrumentation and computing facilities. Project proposal, progress reports, final report, and periodic oral presentations required. Prerequisite: ME 120. (Spring)
- 155 **Fluid Mechanics II (3)** Garriss, Goulard, and Sta  
Potential flow theory. Boundary-layer theory. Drag on immersed bodies: form drag and skin friction. Turbulence. Compressible flow: acoustic speed, Mach number, isentropic flow, nozzle flow, normal and oblique shock phenomena. Raleigh and Fanno flows. Experimental and computational methods. Prerequisite: ME 126, 131. (Fall)
- 182 **Electromechanical Control System Design (3)** Jones and Sta  
Application of control theory to the design of electromechanical systems. Transducers, valves, and other control components. Mathematical models of open and closed-loop electromechanical systems. Root locus and frequency response methods; application to the synthesis of feedback systems by both manual and computer-aided techniques. Prerequisite: ApSc 114; ME 117, 134. (Spring)
- 187 **Heat Transfer (3)** Sta  
Steady- and unsteady-state heat conduction problems. Analytical and numerical solution methods. Convective heat transfer, boundary-layer approach, analogy between heat and momentum transfer. Thermal radiation; fundamental concepts and laws. Heat-exchanger design. Prerequisite: senior status. (Fall)
- 189 **Mechanical Engineering Design (3)** Jones and Sta  
Preparation of a design project requiring interactions between various aspects of mechanical engineering, such as fluid flow, heat transfer, thermal power, stresses and displacements, and mechanism design. Includes preliminary design, prototype development and evaluation, and design optimization. Prerequisite: ME 187; concurrent registration: ME 195 and 196. (Spring)
- 190 **Analysis and Synthesis of Mechanisms (3)** Kaufman and Sta  
Kinematics and dynamics of mechanisms. Displacements, velocities, and accelerations in linkage, cam, and gear systems by analytical, graphical, and computer methods. Synthesis of linkages to meet prescribed performance requirements. Prerequisite: ApSc 58. (Fall)
- 191 **Mechanical Design (3)** Kaufman and Sta  
Integration of knowledge of strength of materials in a design context. Stresses and deflections in engineering structures. Theories of failure. Introduction to the design of mechanical components, such as fasteners, shafts, springs. Introduction to the use of computers in mechanical engineering design. Prerequisite: ME 120, ME 117. (Spring)
- 192 **Manufacturing Processes and Systems (3)** Kramer and Sta  
Introduction to manufacturing techniques for metals, polymers, ceramics, and composites. Relationships between properties of materials and techniques for processing them. Process selection, design, control, and integration. Computer-integrated manufacturing, robotics and assembly automation. Prerequisite: junior status or permission of instructor. (Fall)
- 193 **Engineering Systems Design (3)** Kaufman and Sta  
Creative engineering design, problem definition, and concept generation. Design of bearings, clutches, brakes, and couplings. Optimization of system design using computers and design projects. Graphical communication, project presentation and use of existing design resources. Prerequisite: ME 191. (Fall)
- 194 **Energy Conversion (3)** Sta  
Energy sources and utilization. Production of thermal energy, conversion of chemical energy, fossil fuel systems. Production of electrical energy, fundamen



tal principles, technological options. Energy management and economic considerations. Prerequisite: EE 20. (As arranged)

- 195 **Computer-Aided Design of Mechanical Systems** (2) Staff  
Presentation of the major elements in a computer-aided design system, including interactive computer graphics and methods of design optimization. The finite element method. Design of systems involving a variety of constraints. Consideration of economic, safety, and reliability factors in the design process. Prerequisite: ME 193; concurrent registration: ME 196. (Spring)
- 196 **Design Project** (1) Staff  
Identification and preparation of a design project, including problem formulation, feasibility studies and preliminary design, prototype development and testing, and design optimization. Concurrent registration: ME 195. (Spring)
- 197 **Robotic Systems Design and Applications** (3) Kramer and Staff  
Modeling and analysis of robot designs. Kinematics, statics, and dynamics of linkages. Design and selection of mechanical structures, actuators, transmissions, and sensors. Design of robotic control systems. Relevant computer hardware and software. Industrial applications and limitations of robot systems. Lab experiments. Same as EE 192. (Spring)
- 198 **Research** (1 to 3) Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## ENGINEERING SCIENCE

- 4 **Engineering Drawing and Computer Graphics** (3) Jones and Staff  
Introduction to technical drawing, including use of instruments, lettering, geometric construction, sketching, orthographic projection, section and auxiliary views, dimensioning, pictorial drawings, and intersections and developments. Introduction to computer graphics, including topics covered in manual drawing, and computer-aided drafting. (Fall and spring)

## CLASSICS

Professor J.E. Ziolkowski  
Associate Professor E.A. Fisher (Chair)  
Assistant Professors M.D. Tickin, Y.M. Moses, G.S. Meltzer (Visiting)  
Assistant Professor Lecturer D.B. Beers

Bachelor of Arts with a major in classical humanities—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Clas 1-2, 3, 4; or equivalent; or Clas 11-12, 13-14; or equivalent; and Clas 71, 72.
3. Required courses in the major—(a) 12 credit hours selected from 100-level classics courses; (b) 18 credit hours selected from Art 101, 102, 103, 112, 155; Hist 105, 107, 108, 109, 110, 111, 209; Phil 111; PSc 105; Rel 143.

Bachelor of Arts with a major in classical archaeology and classics—An interdepartmental major arranged in conjunction with the Department of Art. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Clas 1-2, 3, 4; or Clas 11-12, 13-14.
3. Required courses in the major—Art 101, 102, 112, 155; three courses selected from Hist 107, 108, 109, 110, 209; 6 credit hours in 100-level courses in Greek or Latin. (A reading knowledge of French and German is recommended.)

Minor in classical humanities—(a) 6 credit hours selected from Clas 1-2 or 11-12; (b) 9 credit hours selected from Clas 3, 4, 13, 14, 71, 72, 105, 107, 108, 113, 127, 170, 185, 186; (c) 6 credit hours selected from Art 101, 102, 103, 111; Hist 107, 108, 109, 110.

## COURSES IN GREEK, HEBREW, LATIN, AND YIDDISH

- 1-2 **Beginning Latin** (3-3) Ziolkowski  
Grammatical essentials of Latin, appropriate reading selections, development of English derivatives, introduction to Roman life and literature. (Academic year)

- 3 Intermediate Latin: Prose and Poetry (3)**  
Development of ability to read and understand Latin literature of moderate difficulty. Prerequisite: Clas 1-2 or equivalent. (Fall)
- 4 Vergil's Aeneid (3)**  
Significant passages of Vergil's famous epic—In Latin; reading and discussion of the entire poem in translation. Prerequisite: Clas 3 or permission of instructor (Spring)
- 11-12 Beginning Greek: Classical (3-3)**  
Study of the grammar, vocabulary, and structure of ancient Greek. Reading selected ancient authors. (Alternate academic years)
- 13-14 Intermediate Greek: Classical (3-3)**  
Reading of ancient Greek prose or poetic works (e.g., selections from Homer, Plato, Euripides). Review of grammar. Prerequisite: Clas 11-12 or equivalent (Alternate academic years)
- 21-22 Beginning Hebrew (4-4)**  
An active presentation of Hebrew as it is spoken and written today. Comprehension, speaking, reading, and writing skills are stressed. Laboratory fee, \$35 per semester. (Academic year)
- 23-24 Intermediate Hebrew (3-3)**  
Further development of skills in speaking, reading, writing, and comprehension of modern Hebrew. Texts range from Israeli newspaper items to selections from classical materials. Prerequisite: Clas 21-22 or equivalent. Laboratory fee, \$35 per semester. (Academic year)
- 25-26 Yiddish for Reading and Conversation (3-3)**  
Grammatical essentials of the language, appropriate reading selections, conversational exercises for beginners. (Alternate academic years)
- 103 Modern Hebrew Nonfiction (3)**  
Directed readings in humanities and social sciences. Development of linguistic skills necessary for independent research. May be repeated for credit. Prerequisite: Clas 24 or permission of instructor. (Fall)
- 104 Modern Hebrew Fiction (3)**  
Study of selected modern Israeli short stories and poems. Prerequisite: Clas 103 or permission of instructor. (Spring)
- 109-10 Major Latin Authors (3-3)**  
Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Clas 3, 4; or permission of instructor. (Academic year)
- 120-21 Advanced Hebrew Literature (3-3)**  
Selections from Hebrew literature throughout the ages: Bible, Rabbis, medieval Hebrew literature; classical motifs in modern Israeli literature. Literary analysis (writing and discussion) in Hebrew. Prerequisite: Clas 104 or permission of instructor.
- 139-40 Major Greek Authors (3-3)**  
Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Clas 14. (Academic year)
- 185-86 Directed Reading (1, 2, or 3)**  
Advanced reading in Greek, Hebrew, or Latin. Admission by permission of instructor.

## COURSES IN ENGLISH TRANSLATION

- 63 Greek and Latin Origins of Medical Terms (3)**  
Mastery of medical terminology by learning word elements from Greek and Latin and the principles that govern both the formation of medical words and the derivation of their meanings. (Fall)
- 71 Greek Literature and Civilization (3)**  
Study of ancient Greek civilization with focus on public and private life as seen primarily through literature. (Fall)
- 72 Roman Literature and Civilization (3)**  
Study of Roman civilization with focus on public and private life as seen primarily through literature. (Spring)



- 100 Modern Hebrew Literary Classics (3)** Ticktin  
Prose and poetry of a century of writing from the beginning of the Hebrew literary renaissance to contemporary Israeli literature, including works of Bialik, Agnon, Hazaz, Amichai, Oz, and Yehoshua. Discussions stress historical development and authors' treatments of tradition and modernity.
- 101 Israeli Society and Culture: Literary Perspectives (3)** Ticktin  
A study of literature reflecting such contemporary issues as the conflict between the "builders' generation" and their children; the cultural contacts of Ashkenazim and Sefardim; image of the Arab; impact of the Holocaust; Zionist ideals and current realities. (Fall)
- 102 Contemporary Israeli Short Stories and Poetry (3)** Ticktin  
An introduction to post-1948 writers, including A.B. Yehoshua, Amos Oz, David Shahar, Aharon Appelfeld, Dahlia Ravikovitch, Yehuda Amichai, Haim Gury, Amir Gilboa, and Amalia Kahana-Karmon. (Spring)
- 105 Special Topics (3)** Staff  
Topics in Greek, Hebrew, Roman, and Yiddish literature; topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs.
- 107 Greek and Roman Mythology (3)** Ziolkowski  
The creation of the world, the nature of the gods, and the adventures of heroes as described in various Greek and Roman literary sources (e.g., epic, drama, hymns) and as shown in ancient art. (Fall)
- 108 Approaches to Classical Mythology (3)** Staff  
Selected classical myths examined through various disciplinary approaches, such as archaeology, psychology, history, and women's studies. Prerequisite: Clas 107. (Spring)
- 113 Greek and Roman Drama (3)** Staff  
Study of Greek and Roman tragedy and comedy; the nature and setting of dramatic performance in classical antiquity. (Spring)
- 127 Classical Influence on Western Civilization (3)** Ziolkowski  
A survey of Greek and Roman influence on Western civilization, especially in architecture, language, literature, and science. Prerequisite: a course in classical literature or history.
- 170 Women in Classical Antiquity (3)** Staff  
In-depth study and discussion of readings from ancient and modern sources on the role of women in Greek and Roman society.

## COMMUNICATION

Professors C.H. Sterling (Acting Chair)  
Associate Professors J.E. Thiel, C. Warren (Visiting)  
Assistant Professors S. Keller, D.A. Durham, M. Keeler, M. Keith (Visiting)  
Adjunct Assistant Professors M.M. Travis, D. Havinga  
Instructor E.M. Murray

**Bachelor of Arts with a major in radio-television**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences, including Phil 45 and Stat 51 or 53 or 91; Psyc 1 and 8 or Econ 11 and 12; and Phil 51 and 52.
2. Required courses in related areas—15 credit hours of 100-level courses in a single subject area outside the Communication Department, as approved by the major advisor.
3. Required departmental courses—Comm 1, 100, 110, and 199.
4. Required courses in the major—Comm 75, 133, 134, and 145. Eighteen hours of 100-level radio-television or film courses, as approved by the major advisor; 9 of these hours must be in the 180-189 sequence.

**Bachelor of Arts with a major in speech communication**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences, including Phil 45 and Stat 51 or 53 or 91; Psyc 1 and 8 or Econ 11 and 12; and Phil 51 and 52.
2. Required courses in related areas—15 credit hours of 100-level courses in a single subject area outside the Communication Department, as approved by the major advisor.

3. Required departmental courses—Comm 1, 100, 110, and 199.  
 4. Required courses in the major—Comm 112, 121, 126, and 143 or 144. Fifteen hours 100-level speech communication courses as approved by the major advisor; 6 of the hours must be in the 180–189 sequence.

*Minor in speech communication*—18 credit hours of communication courses, including Comm 1, 112, 121, and 126.

- 1 Speech Communication (3)** Keller and Sta  
 The study and practice of the basic principles and techniques of public speaking used to inform and persuade audiences. Emphasis on the speech building process: research, composition, organization, style, delivery, and criticism. (Fall and spring)
- 30 Television's View of America (3)** Trav  
 The role of television entertainment and news programming in portraying the American people and interpreting their values and aspirations, their faults and frailties, their successes and failures, their heroes and villains. (Summer)
- 55 Introduction to Electronic Mass Media (3)** Sta  
 Introduction to theory, forms, content, research, and societal role of American broadcasting and newer media as a process in communication. The course provides a context for studies in journalism, management, sociology, political science, and economics. (Summer)
- 75 Sight and Sound (3)** Thiel  
 Development of a critical awareness of aural and visual communication through an introduction to the aesthetics, techniques, and organization of the creative process in electronic media. Lecture (2½ hours), laboratory (2 hours). Prerequisite: permission of instructor for nonmajors. Laboratory fee, \$30. (Fall and spring)
- 100 Communication Theory (3)** St  
 Study of the various theoretical approaches that may explain the role of communication in society and its impact and practice. Examination of theories of rhetoric, communication, and mass communication, along with the biases, assumptions, and research methodologies of each approach. (Fall and spring)
- 110 Research Methods in Communication (3)** Sta  
 Scientific method and ethics of research, examined in relation to the study of communication. (Spring)
- 111 Business and Professional Speaking (3)** Sta  
 Study of the communication process in business and professional organizations; practice in interviewing, small-group communication, and speeches for special occasions. For nonmajors only. (Fall and spring)
- 112 Persuasion (3)** Warren  
 In-depth study of the principles and techniques of persuasion, focusing on theory and practice. Emphasis is placed on the common-premise model while considering factors of image, support materials, emotion, audience analysis, and style. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 121 Small Group Communication (3)** Sta  
 The study and practice of communication in small groups focusing on problem solving, norms, roles, and leadership. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 126 Argumentation and Debate (3)** Sta  
 Study of the advocacy process, with emphasis on issue identification, use of evidence, and logical proof. Practice in oral advocacy and argumentative speaking. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 127 Forensic Practice (1)** Keller  
 Student participation in intercollegiate speech activities. May be repeated for a total of 4 credit hours of credit. Admission by permission of instructor. (Fall and spring)
- 129 TV News: The Politics of Visibility (3)** Sta  
 Same as Jour/PSc 129.
- 130 Radio and Television Production for Non-Communication Majors (3)** Having  
 Basic concepts of radio and television as communications media, with emphasis on design and production techniques with applications in political communication.



- tion. Priority given to political communication majors. Laboratory fee, \$30.  
(Fall and spring)
- 132 **Radio-Television Performance** (3) Thiel  
Introduction to the basic theories and techniques required for effective, non-dramatic media performance (i.e., announcing, moderating, newscasting, etc.).  
Prerequisite: Comm 1. Laboratory fee, \$30. (Spring and summer)
- 133 **Development of American Electronic Media** (3) Sterling  
Study of the origins, structure, and nature of American broadcasting and related media. (Spring)
- 134 **Sound Design** (3) Keith  
Introduction to basic concepts of traditional audio and sound design as creative communication medium; emphasis on design and technique for a variety of formats. Lecture (2½ hours), laboratory (2 hours). Prerequisite: Comm 75 (for radio-television majors) or permission of instructor. Laboratory fee, \$30.  
(Fall and spring)
- 137 **Scriptwriting** (3) Keith  
Study and practice of the forms, techniques, and types of writing for radio, television, and film. Prerequisite: Engl 11 or 12, and Comm 75 (for radio-television majors) or permission of instructor. (Fall)
- 142 **Topics in Electronic Media** (1 to 3) Staff  
Topic and fee announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. (Fall, spring, and summer)
- 143 **Origins of Contemporary Rhetorical Theory** (3) Warren  
Study of rhetorical theory and method as they evolved in the Western world from the classical period to the present. (Fall, even years)
- 144 **History of Rhetoric in American Public Address** (3) Staff  
Study of American oratory from its pre-Revolution origins to the present day, interpreted in terms of issues and movements. (Spring, odd years)
- 145 **Image Design** (3) Keeler  
Introduction to basic concepts of video as a creative communication medium; design and technique, planning, and directing in a studio context. Lecture (2 hours), laboratory (2½ hours). Prerequisite: Comm 134. Laboratory fee, \$40.  
(Fall)
- 146 **Television Directing** (3) Thiel  
Advanced study and practice of television directing techniques. Students are expected to demonstrate skill in working with studio and electronic field production equipment and in the development of television programs from original concepts to final productions. Lecture (2 hours), laboratory (3 hours). Prerequisite: Comm 145 and permission of instructor. Laboratory fee, \$40. (Spring)
- 171 **Language of Cinema** (3) Travis  
Introduction to cinema as language through analysis of the components of film structure—camera, editing, sound, movement, music, dialogue, and mise-en-scène. Laboratory fee, \$30. (Fall)
- 173 **History of Cinema** (3) Travis  
An examination of the history, structure, and theory of motion pictures in America and abroad. Same as Art 173. Laboratory fee, \$35. (Fall)
- 174 **Special Studies in Film** (3) Staff  
In-depth study of specific film topics. Prerequisite: Comm 173. Laboratory fee, \$30. (Spring)
- 175 **The Political Image** (3) Travis  
An analysis of the techniques of propaganda and rhetoric used in film and television to visualize political ideology. Laboratory fee, \$30. (Spring, even years)
- 176 **Film as Fact and Fiction** (3) Travis  
A comparison of structural differences between documentary and fiction film in order to study how each presents different versions of reality. Laboratory fee, \$30.  
(Spring, odd years)
- 180 **Regulation and Policy in Electronic Media** (3) Sterling  
Legal, technical, political, economic, and social aspects of radio, television, and cable and related delivery systems. Structure and operation of FCC and other agencies, plus role of Congress and courts. Consideration of problems in spectrum allocation, behavioral regulation, the trend to deregulate political influence, and current policy matters. Prerequisite: Comm 133. (Fall)

- 181 Electronic Media Management (3)**  
Decision-making, strategic planning, and daily operations of radio, television and cable; programming and sales strategies, promotion, and impact of rating and research. Prerequisite: Comm 133. (Spring)
- 182 Innovation in Electronic Media (3)**  
Examination of current and future trends in electronic media, with emphasis on radio, television, and cable, including developments in technology, programming, industry structure, and public policy. Prerequisite: Comm 133. (Fall)
- 184 International Communication (3)**  
Major international news-gathering and broadcasting organizations, international communications policy forums, organizations and treaties, spectrum allocation criteria, communications technology, programming development and trade. International propaganda as a policy tool; "New World Information order." Prerequisite: Comm 133. (Spring, even years)
- 185 Comparative Communication Systems (3)**  
In-depth study of the developmental, regulatory, political, economic, and cultural dimensions of selected foreign communication systems; emphasis on broadcasting, cable, and satellite applications. Prerequisite: Comm 133. (Spring)
- 187 Seminar: Topics in Communication (1 to 3)**  
Topic and fee announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. (Fall and spring)
- 189 Effects of Electronic Media (3)**  
Current concepts of the impact of broadcasting and related media on audiences; social science research findings and methods, including persuasion, formation of opinion, media and personal interaction, violence, audience characteristics and media use patterns, and development of related theories and models of mass communication. Prerequisite: Comm 133. (Spring)
- 196 Independent Study (1 to 3)**  
Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in speech communication. Before students are permitted to register for Comm 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will be directing the study and of the department chair.
- 197 Internship: Electronic Media (3)**  
Open to seniors majoring in radio-television. Students will spend at least 16 hours a week during the semester in an approved media position with local, nonprofit, corporate, or commercial organizations. Seminar meetings, reports and career-oriented projects. Admission requires departmental approval. May be repeated once for credit. (Fall and spring)
- 199 Senior Seminar in Communication (3)**  
Capstone course for communication majors. Integration of the concepts of communication. Under the guidance of an instructor, the student writes a major research paper on an approved topic. Prerequisite: permission of instructor and major advisor. (Fall)

## COMPUTER AND INFORMATION SYSTEMS

See *Statistics/Computer and Information Systems*.

## COMPUTER SCIENCE

See *Electrical Engineering and Computer Science*.

## COUNSELING

See *Human Services*.

## CRIME IN COMMERCE

See *Forensic Sciences*.



**CRIMINAL JUSTICE**

See Sociology.

**DANCE**

See Theatre and Dance.

**DRAMA**

See Theatre and Dance.

**EARLY MODERN EUROPEAN STUDIES****Committee on Early Modern European Studies**

R.E. Kennedy, Jr. (Chair), I. Azar, C.A. Linden, J.A. Quitslund, L.F. Robinson, R.H. Schlagel, K. Thoenelt, D. Wallace

The Columbian College of Arts and Sciences offers an interdisciplinary program in Early Modern European Studies. This humanities program is designed to enhance the student's understanding of the history, philosophy, religion, science, literature, and art of the five centuries (1300–1800) during which the Western world began to take on its modern dimensions. The program is directed by an interdepartmental committee.

*Bachelor of Arts with a major in early modern European studies*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Requirements for the major:
  - a. The core interdisciplinary course Individualism, Reason, and Tradition in Early Modern Europe (Hist/Engl/Fren/Ger/Rel 183, and Art 187).
  - b. Six credit hours of second-group French, German, or Spanish literature courses taught in the language, from among the following: Fren 120, 121, 122, 123; Ger 103–4, 111–12, 131–32; Span 121–22, 123–24, 125.
  - c. Phil 112; Rel 145; PSc 106.
  - d. Twenty-seven credit hours of art history, history, and English literature, with the course distribution to be determined in consultation with the program advisor, and with a minimum of 6 hours from each of the following groups: Art 104–5, 106–7, 108, 113–14, 121–22; Engl 125–26, 127–28, 129, 130, 131–32; Hist 101, 105, 121–22, 123, 141, 148, 151, 153, 154.

**EAST ASIAN LANGUAGES AND LITERATURES**

Professors C.W. Shih (Chair), J. Chaves  
 Associate Professors D.L. Lee, Y.-K. Kim-Renaud  
 Associate Professorial Lecturer M.-J.C. Loh  
 Assistant Professor G.C.Y. Wang  
 Assistant Professorial Lecturer M. Frost  
 Instructor T. Kimura  
 Lecturers L.Y.C. Jordano, N.H. Kuo

*Bachelor of Arts with a major in Chinese language and literature*—The requirements are as follows:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Chin 5–6 (preferred); or Chin 1–2, 3–4.
3. Required for the major—Chin 11–12, 107–8, 109–10, and 6 hours selected from Chin 161, 163–64, 181, 82; plus 12 additional credit hours of 100-level Chinese courses.

*Minor in Chinese language and literature*—Prerequisite: 18–22 credit hours, including either Chin 1–2, 3–4, and 11 or Chin 5–6 and 11. The minor consists of 12 additional credit hours selected from Chin 12, 107–8, 109–10, 123–24, 163–64, 179–80, or 181–82.

*Minor in Japanese language and literature*—Prerequisite: 22 credit hours, including Japn 1–2, 3–4, and 5–6. The minor consists of 12 additional credit hours: Japn 7–8 and Japn 111–112.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

## CHINESE

- 1-2 Basic Chinese (4-4)**  
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$35 per semester. (Academic year)
- 3-4 Basic Chinese (4-4)**  
Continuation of grammar and spoken Chinese, with more emphasis on the written language and reading. Laboratory fee, \$35 per semester. (Academic year)
- 5-6 Intensive Basic Chinese (8-8)**  
Intensive beginner's course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Laboratory fee, \$35 per semester. (Academic year)
- 10 Chinese Calligraphy (1)**  
Writing of Chinese characters with traditional writing implements. No knowledge of the language required. May be repeated for credit. (Fall and spring)
- 11-12 Intensive Intermediate Chinese (6-6)**  
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Prerequisite to Chin 11: Chin 6. Laboratory fee, \$35 per semester. (Academic year)
- 22 Intermediate Chinese Conversation (3)**  
A practical course for improving speaking ability. Prerequisite: 6 credit hours of Chinese or equivalent. May be repeated for credit. (Fall and spring)
- 107-8 Readings in Modern Chinese (3-3)**  
Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Chin 12 or equivalent. (Academic year)
- 109-10 Introduction to Classical Chinese (3-3)**  
Introduction to classical writings in Chinese literature, history, and philosophy. Prerequisite: Chin 6. (Alternate academic years)
- 123-24 Introduction to Chinese Linguistics (3-3)**  
Introduction to the history of the Chinese language. Analysis of linguistic structure of modern spoken Chinese and classical Chinese. Prerequisite: Chin 6 or equivalent, or a course in linguistics. (Alternate academic years)
- 161 Chinese Culture Through Films (3)**  
Survey of the Chinese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English.
- 163-64 Chinese Literature in Translation (3-3)**  
An introductory course focusing on major works of poetry, drama, and the novel in their historical and social context. (Academic year)
- 179-80 20th-Century Chinese Literature (3-3)**  
Works of Lu Xun, Lao She, and others. Drama of Tian Han and Cao Yu. Prerequisite: Chin 107 or equivalent. (Alternate academic years)
- 181 Literature in Traditional Chinese Society—in Translation (3)**  
Introduction to the various roles played by literature in pre-modern China, as well as the reflection of society in traditional literature.
- 182 Literature in the People's Republic of China—in Translation (3)**  
Survey of stories, poems, and plays in the PRC and their role in political and social events.
- 185-86 Directed Reading (3-3)**  
Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)
- 199-200 Proseminar: Readings for the Major in Chinese Language and Literature (3-3)**  
Conferences and group discussions. (Academic year)



## JAPANESE

- 1-2 **Basic Japanese (4-4)** Kimura, Kuo  
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$35 per semester. (Academic year)
- 3-4 **Basic Japanese (4-4)** Kimura, Kuo  
Continuation of grammar, with more emphasis on written language and reading. Laboratory fee, \$35 per semester. (Academic year)
- 5-6 **Intermediate Japanese (3-3)** Kimura  
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$35 per semester. (Academic year)
- 7-8 **Intermediate Japanese (3-3)** Kimura  
Continuation of reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$35 per semester. Prerequisite: Japn 5-6. (Academic year)
- 111-12 **Japanese Literature in Translation (3-3)** Chaves  
An introductory survey of traditional and modern Japanese literature read in English translation: love and nature poetry; theater (classical drama, puppet plays); fiction; diaries. Particular emphasis is placed on the great women writers of Japan. (Academic year)
- 162 **Japanese Culture Through Films (3)** Shih, Chaves  
Survey of the Japanese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English. (Spring)

## KOREAN

- 1-2 **Basic Korean (4-4)** Kim-Renaud  
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$35 per semester. (Academic year)
- 3-4 **Basic Korean (4-4)** Kim-Renaud  
Continuation of grammar, with more emphasis on written language and reading. Laboratory fee, \$35 per semester. (Academic year)
- 5-6 **Intermediate Korean (3-3)** Kim-Renaud  
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$35 per semester. (Academic year)

## EAST ASIAN STUDIES

**Program Committee:** W.R. Johnson (Director), H.C. Hinton, Y.C. Kim, C.W. Shih, G. Sigur, R. Thornton, R.Y. Yin

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in East Asian studies (with a focus on either China or Japan).

**Bachelor of Arts with a major in East Asian studies**—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.
3. Required courses for the major—for the China focus: Chin 5-6, 11, and either 163 or 164; Econ 169; for the Japan focus: Japn 1-2, 3-4, either 111 or 112, and 3 additional hours in Japanese language; Econ 170; for both the China and Japan focus: one course selected from Geog 127, 132, 133, 134, 146, 266; three courses selected from Hist 137, 188, 189, 195, and either 187 or 196 (courses covering both premodern and modern periods are recommended); PSc 170 or 173; three 100-level elective courses in economics, history, or political science that are not related to China or Japan and that are selected in consultation with the advisor.
4. Preparation of a substantial research paper in a two-semester research course or independent study related to the chosen focus on China or Japan. The courses taken to fulfill this requirement must be approved in advance by the program director.

**ECONOMICS**

Professors J.W. Kendrick (Emeritus), C.T. Stewart, Jr., J. Aschheim, H. Solomon, S. Levitan (Emeritus), C.Y. Hsieh (Emeritus), J.L. Gastwirth, M.A. Holman, R.M. Dunn, Jr., W.F.E. Long (Emeritus), S.E. Haber, R.S. Goldfarb, O. Havrylyshyn, A.M. Yezer, J.J. Cordes, J. Pelzman, J.E. Kwoka, R.P. Trost, B.L. Boulier (Chair), G. Brock (Visiting)

Adjunct Professors J. Hardt, E.H. Solomon, D.J. Rousslang

Associate Professors R.Y. Yin, H.S. Watson, M.D. Bradley, S.C. Smith, A. Klammer

Adjunct Associate Professor M.A. Baily

Assistant Professors V. Fon, M.-H. Ye, R.F. Phillips, F.L. Joutz, M.O. Moore, S.M. Suranovic, H. Courtney, B. Drees, N. Vonortas

**Bachelor of Arts with a major in economics**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite course—Econ 11–12.
3. Required courses in related areas—Math 41 and 42, or equivalent; Stat 111 and 112, or equivalent; 6 credit hours of a social science other than economics (Hist 39–40 or 71–72 are recommended) or Phil 51–52.
4. Required courses in the major—Econ 101, 102, 121, 198, and five additional 100-level economics courses to be approved by the departmental advisor. Grades of C– or better are required in Econ 101 and 102. A maximum of three regional courses (Econ 133, 134, 169, 170, 185) can be counted toward the five additional courses.

**Minor in economics**—(a) 18 credit hours in economics, including Econ 11–12, 101, 102, 121, and one other 100-level course in economics; (b) 6 credit hours of an approved statistics sequence, such as Stat 111–12; or 6 hours selected from Math 31, 32, 41–42, 51–52; or 3 hours of an approved statistics course plus 3 hours selected from Math 31, 32, 41–42, 51–52. Grades of C– or better are required in Econ 101 and 102.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** Econ 11–12 is prerequisite to all other courses offered by the Department of Economics.

**11–12 Principles of Economics (3–3)**

Bradley, Dunn, Goldfarb, Trost, Yezer

Major economic principles, institutions, and problems in contemporary life. Econ 11: Microeconomics—supply and demand, the price system and how it works, competitive and monopolistic markets. Econ 12: Macroeconomics—national income concepts, unemployment and inflation, institutions of monetary control. Econ 11 is prerequisite to Econ 12. (Econ 11 and 12—fall and spring)

**101 Intermediate Microeconomic Theory (3)**

Fon, Goldfarb, Phillips,

Haber, Vonortas

Analysis of household economic behavior, including derivation of demand functions. Analysis of firm behavior, including derivation of supply frameworks. Demand and supply interaction under various market structures and in factor markets. (Fall and spring)

**102 Intermediate Macroeconomic Theory (3)**

Bradley, Courtney, Joutz

Investigation of the determinants of national income, inflation, unemployment, and interest rates. Alternative business cycle theories, with emphasis on the role of imperfect information, uncertainty, and expectations. (Fall and spring)

**104 History of Economic Thought (3)**

Klammer

History of the major schools of economic thought, influence of changing problems on the development of economic theory. Prerequisite: Econ 101, 102.

**105 Economic Conditions Analysis and Forecasting (3)**

Staff

Theory and empirical analyses of economic trends and fluctuations; use of economic indicators and simple econometric models. (Fall)

**121 Money and Banking (3)**

Joutz, Drees

The role of money, credit, interest rates, foreign exchange rates, and commercial banks and other financial institutions in the U.S. economy. (Fall and spring)

**122 Monetary Theory and Policy (3)**

E. Solomon, Drees

Analysis of classic and modern monetary theories and their application to current economic conditions. The links between theory and policy. The altered role of money over time; the new money technology. (Spring)



- 123 **Introduction to Econometrics** (3) Trost, Phillips  
Joint offering of the Economics and Statistics Departments. Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Math 31 or 41; Stat 112. (Spring)
- 130 **Comparative Economic Systems** (3) Staff  
Critical exposition of fundamental economic concepts and theories of capitalism, communism, socialism, and fascism.
- 133 **Economy of the Soviet Union** (3) Pelzman, Hardt  
Analysis and review of the economic development and performance of the Soviet Union from the pre-revolutionary period to the present. (Fall)
- 134 **Comparative Communist Economic Systems** (3) Pelzman, Hardt  
Analysis and review of the economic development and performance of the East European economies in the post-World War II period. Soviet-type and alternative planning models. (Spring)
- 136 **Natural Resources and Environmental Economics** (3) Yezer  
Analysis of market mechanisms that allocate energy and natural and environmental resources; investigation of actual and optimal resource allocation across uses and time; review of arguments for public intervention. (Spring)
- 141 **Women and Work in the United States** (3) Haber, Palmer  
Same as WStu/AmCv 260.
- 142 **Labor Economics** (3) Haber  
Analysis of labor supply and demand; measurement and theory of unemployment; occupational choice; wage differentials; labor market issues and policies. (Fall)
- 148 **Health Economics** (3) Bailly  
Economic analysis of the determinants of demand, supply, output, and distribution in the health care sector, with special emphasis on current policy issues of access, quality, and cost. (Fall)
- 151 **Economic Development** (3) Havrylyshyn, Smith  
Theories and empirical studies of the economic problems of developing countries. (Fall and spring)
- 153 **Income Distribution** (3) Haber  
An analysis of the distribution of income, with focus on issues relating to wealth and poverty. (Spring)
- 157 **Urban and Regional Economics** (3) Yezer  
Analysis of the determinants of urban growth and development; firm location; the functioning of urban land and housing markets.
- 158 **Industrial Organization** (3) Kwoka  
Analysis of market structure, conduct, and performance of firms in a market economy, with emphasis on case studies of U.S. industries. (Fall)
- 159 **Government Regulation of the Economy** (3) Kwoka  
Economic analysis of antitrust and regulation in the American economy. Prerequisite: Econ 158 or 101. (Spring)
- 161 **Public Finance I** (3) Cordes, Watson  
Theoretical and institutional analysis of government expenditures and inter-governmental fiscal relations. (Fall)
- 162 **Public Finance II** (3) Cordes, Watson  
Theoretical and institutional analysis of tax policy and debt management. (Spring)
- 165 **Economics of Human Resources** (3) Stewart  
Economic analysis of education and training, research and innovation, and their relation to economic growth. (Fall)
- 169 **Introduction to the Economy of the People's Republic of China** (3) Yin  
Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)
- 170 **Introduction to the Economy of Japan** (3) Staff  
Analysis of the structure and growth of the Japanese economy. (Spring)
- 179 **U.S. Economic History** (3) Berkowitz  
Same as Hist 179.
- 181-82 **International Economics** (3-3) Dunn, Pelzman, Moore, Suranovic  
Econ 181: International trade theory and international monetary theory. Econ 182: Continuation of international monetary theory; economic development. (Academic year)

- 183 Economic History and Problems of Latin America (3)** Staff  
Analysis of present structures and problems of Latin American economies. (Spring)
- 195 Special Topics in Economics (3)** Staff  
Topics vary, depending on current issues of interest and faculty availability. (Fall and spring)
- 198 Proseminar in Economics (3)** Aschheim, Stewart  
Preparation and presentation of a research paper in any field of economics agreed upon by student and instructor. Review of selected topics in contemporary economics. Open only to economics majors in their senior year. (Fall and spring)
- 199 Independent Research in Economics (3)** Staff  
Under the personal direction of an instructor. Limited to economics majors with demonstrated capability. Prior approval of instructor required. (Fall and spring)

### EDUCATIONAL LEADERSHIP

Professors S.R. Paratore, R. Ferrante, G.W. Smith (Chair), D.H. Holmes, L.D. Leonard  
Adjunct Professors C. Gerhard, D. Iwamoto, H. Torabi  
Associate Professor W.F. Lynch  
Assistant Professor C.B. Stapp  
Adjunct Assistant Professor D. Niles

See the School of Education and Human Development for programs of study leading to the degree of Bachelor of Arts in Education and Human Development.

- 100 Special Workshop in Education and Human Development (arr.)** Staff  
Topics to be announced in the *Schedule of Classes*. May be repeated for credit. (Fall and spring)
- 104 Psychology for Learning and Teaching (3)** Gerhard  
Principles, theory, nature, and course of learning and teaching processes. Examination and analysis of the strategies and dynamics of teaching and learning in behavioral settings. Three-hour fieldwork sessions. (Fall and spring)
- 112 Measurement and Evaluation (3)** Staff  
Basic evaluative measurement techniques: selection, administration, and interpretation of standardized tests; test construction, evaluation procedures, statistical analysis. (Fall and spring)
- 120 Experimental Course in Education and Human Development (arr.)** Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 125 Museums as Cultural and Educational Resources (3)** Staff  
Use of the museum for knowledge and enjoyment; museum objects as primary sources; meetings in art, history, and science museums in the metropolitan area. (Fall and spring)
- 171 Introduction to Human Development I (3)** Staff  
Lectures and fieldwork. All aspects of development through adolescence; child study techniques. Two to three hours weekly field experience in appropriate setting. (Fall and spring)
- 172 Introduction to Human Development II (3)** Staff  
Adult development from young adulthood to old age. Dominant psychological, social, and physical competencies; motivational changes; coping styles; maladaptive behavior. Three hours weekly field experience in appropriate agency setting. (Fall and spring)
- 180 Computer Literacy (3)** Lynch  
An introduction to computing systems. Word-processing, desktop publishing, graphics, database management, spreadsheets, charting, programming, and communications software are introduced through reading, demonstrations, and hands-on activities in a microcomputer classroom. No previous computer experience required. May be taken for graduate credit. (Fall, spring, and summer)
- 187 Sign Language and Deafness I (3)** Staff  
Introduction to American Sign Language and to cultural aspects of the deaf community.



- 188 Sign Language and Deafness II (3)** Staff  
Development of conversational skills in American Sign Language and of cultural awareness of the deaf community. Prerequisite: Educ 187.
- 193-94 Research and Independent Study (arr.)** Staff  
Individual research under guidance of a staff member. (Academic year)
- 200 Special Workshop in Education and Human Development (arr.)** Staff  
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

## ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors R.B. Heller, W.K. Kahn, R.L. Pickholtz, M.F. Eisenberg, A.C. Meltzer, W.D. Maurer, A.D. Friedman, H.J. Helgert, R.H. Lang, N. Kyriakopoulos, J.D. Foley (Chair), T.N. Lee, E. Della Torre, R.J. Harrington, L.J. Hoffman, O.N. Garcia, W. Wasylkiwskyj, N.A. Alexandridis, S.Y. Berkovich, M.B. Feldman, S.J. Raff (Research), M.H. Loew, G.V. Borgiotti, R.L. Carroll, Jr., M.E. Zaghoul, M. Pardavi-Horvath

Adjunct Professors J.M. Aein, P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, C. Alexander, Jr.

Professorial Lecturers H.-L.A. Hung, A.A. Wolf, W.D. Jackson, W.T. Bisignani, R.K. Khatri, C.E. Dunham, L.M. Leibowitz, P.M. Kelly, M. Mohajeri, F. Dellon, J.R. Silverman, J.A. Knight, J.H. Scharen-Guivel, M.H. Friedman, T.T. Nieh, G.M. Borsuk, J. Donelson III, J.W. Benoit, R.A. Herring, Jr., A.F. Manfredi, Jr., A.K. Mehrotra, C.-H.C. Wang, W.W. Wu, R.M. Finn, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, M.S. Gluck, D.R. Smith

Associate Professors D.C. Rohlfis (Director of Laboratories), J.L. Sibert, P.S. Bock, D.B. Newman, Jr., N.S. Chauhan (Visiting), Z. Kitov (Research)

Associate Professorial Lecturers M.C. Chen, R.D. Angelari, J.C.-C. Hsing, G.R. Lawrence, J.W. Fussel, P.A. Lamb, C.V. Stewart, A.L. Breitler, P.K. Wahi, C.A. Eldridge, J.A. Lipkin, Y.-S. Fu, C.M. Waespy, J. Epstein, L.A. Fletcher, J.S. Davies, Jr., A.T. Le, E.B. Leiderman, E.H. Neal, J.J. Seppy, L.L. Burge, J.E. Pfaendtner, C.E. Knadler, Jr., E.A. Walker

Assistant Professors S. Rotenstreich, D. Saha, R.S. Heller, A.K. Kakaes, C.D. Martin, B. Narahari, H. Senay, A. Youssef, H.-A. Choi, K.B. Eom, J.K. Hahn

Assistant Professorial Lecturers T.R. Husson, K.J. Schmucker, J.B. Bronder, S.J. Koch, J.D. Kotulski, R.M. Tarakan, E.A. Walker, T. Nelson, R.M. Holland, J.W. Sargent, M.F. D'Antonio, M.C. McElvaney, Y.K. Park, E.S. Armstrong, J.F. Kuehls, D.D. Moerder

See the School of Engineering and Applied Science for programs of study leading to the Bachelor of Science (Electrical Engineering), Bachelor of Science (Computer Science), and Bachelor of Science (Computer Engineering).

## ELECTRICAL ENGINEERING

- 11 Linear Networks I (3)** Zaghoul and Staff  
Network concepts, elements, and parameters. Kirchhoff's laws, simple networks, energy and power, differential equations of networks and their solution. First- and second-order networks, phasors, and steady-state analysis. Use of circuit-simulation programs. Prerequisite: ApSc 113, Phys 15. (Fall and spring)
- 12 Linear Networks II (3)** Zaghoul and Staff  
Singular functions; Laplace transform; network functions, poles and zeros; total response; time and frequency domains; convolution theorems; Fourier analysis, spectra; frequency response, Bode plots; two-port parameters. Use of circuit-simulation programs. Prerequisite: ApSc 114, EE 11. (Fall and spring)
- 20 Introductory Engineering Electronics (3)** Harrington and Staff  
Solid-state devices used in electronic engineering. Physics of their operation. Application to electronic circuits. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Design concepts through use of SPICE, MICRO-CAP II, and graphical techniques. Prerequisite: EE 11. (Fall and spring)
- 30 An Introduction to Electric Fields and Waves (3)** Lang and Staff  
Maxwell's equations, pulse propagation in one dimension, transmission line equations, reflection coefficient, capacitance and inductance calculations, Smith chart, plane waves, reflection from a dielectric of fiber and integrated optics. Prerequisite: ApSc 114, Phys 15. (Fall)
- 31 Fields and Waves I (3)** Kahn and Staff  
Review of vector calculus, orthogonal coordinates, Coulomb and Gauss laws, solid angle, scalar potential, dipoles, method of images, dielectrics, capacitance,

- Laplace and Poisson equations, boundary-value problems, numerical solutions with applications. Prerequisite: ApSc 113; Phys 15, 16. (Fall, even years)
- 32 **Fields and Waves II (3)** Kahn and Staff  
Currents, introduction to electrical transmission lines, impedance matching, Smith chart, Biot-Savart law, Ampere law, vector potential, magnets, magnetic circuits for power transformers, Maxwell equations, plane waves, Poynting vector with applications. Prerequisite: ApSc 114, EE 31. (Spring, odd years)
- 64 **Instrumentation and Electronics Laboratory (2)** Rohlf and Staff  
Use of electronic instruments to measure electrical and electronic components. Verification of electrical circuit theorems and measurement of electrical parameters. Measurement of the characteristics of electronic components. Design and testing of amplifiers and power supplies. Characteristics and limitations of devices and instruments. Concurrent registration: EE 20. (Fall)
- 66 **Digital Electronics Design Laboratory (1)** Rohlf and Staff  
Characteristics of electronic devices used in switching, sweeping, and waveforming circuits. Generation of waveforms. Digital storage devices and sequential circuits. Characteristics of different methods to produce binary logic gates. Characteristics of integrated circuits. Prerequisite: EE 65; prerequisite or concurrent registration: EE 122. (Fall and spring)
- 67 **Switching Circuits Laboratory (1)** Rohlf and Staff  
Analysis and design of combinational and sequential switching circuits. Design and test of encoders, decoders, multiplexers, and arithmetic units. Design of combinational circuits using a PLA, counters using a PLD, and random access memory systems. Prerequisite or concurrent registration: CSci 140, EE 64, 122. (Fall)
- 113 **Network Analysis and Design (3)** Kyriakopoulos and Staff  
Network analysis using graphs, matrices, and state-space techniques. Signal flow graphs and transfer functions. Network properties. Computer-aided network design. Introduction to digital filters. Prerequisite: EE 12, 20. (Fall)
- 116 **Introduction to Network Synthesis (3)** Lee and Staff  
Network functions and their properties. Synthesis of two-element-kind networks. Ladder network transfer function synthesis. Second-order active filter synthesis and design. Sensitivity analysis and design. SPICE program as toolkit for design. Prerequisite: EE 113. (Spring, odd years)
- 121 **Engineering Electronics and Design (3)** Heller and Staff  
Graphical analysis and design beyond the level covered in EE 20. Design of push-pull, direct-coupled, and class B and C amplifiers. Design of operational amplifiers; use in filters and electronic systems. Design of oscillators, active filters, modulators, and demodulators. Use of SPICE and MICRO-CAP II in design. Prerequisite: EE 12, 20. (Fall)
- 122 **Digital Electronics and Design (3)** Eisenberg and Staff  
Introduction to the design of large signal circuits used in computers and communications systems. Design of logic gates and flip-flops. Concepts in integrated circuit design. Design of counting and timing circuits using ICs. Pulse, sweep, and wave-shaping circuits. Prerequisite: EE 12, 20. (Spring)
- 124 **Nonlinear Electronic Devices (3)** Heller and Staff  
Electronic devices designed from nonlinear or quantum mechanical principles. Surface acoustic wave devices and filters. Varactors as converters, and parametric amplifiers. MOS capacitors and CCD devices; Klystrons, TWTs and gyrotrons. MASERS, LASERS, and FELs; negative conductance; transferred electron mechanism in GaAs; Gunn oscillators. Prerequisite: EE 32, 121. (Spring)
- 126 **Introduction to VLSI Design and Simulation (3)** Zaghloul and Staff  
Design of VLSI circuits. Stick diagramming, NMOS transistors, switch and gate logic, PLAs, finite-state machines, design rules, CAD system, speed and power considerations, floor planning, layout techniques. The student will design a VLSI circuit and simulate the design. May be taken for graduate credit. Prerequisite: CSci 140; EE 122 or equivalent. (Fall)
- 127 **VLSI Fabrication Techniques (3)** Zaghloul and Staff  
Choice of circuit technologies, process technologies associated with various types of components. Fabrication of VLSI, two basic MOS technologies and other available technologies, oxidation, photoengraving, chemical etching, diffusion. May be taken for graduate credit. Prerequisite: CSci 140; EE 122. (Spring)



- 128 **Testing and Simulation of VLSI Circuits** (3) Zaghoul and Staff  
Continuation of EE 126, principally for the testing of VLSI circuits that have been designed and fabricated. Topics include testing techniques and use of the VLSI system-testing laboratory. Design for testability techniques and design of a testable system. Students must test the circuits previously designed. May be taken for graduate credit. Prerequisite: EE 126. (Spring)
- 133 **Electromagnetic Waves and Microwave Systems Design** (3) Kahn and Staff  
Time-harmonic Maxwell equations, complex Poynting vector, transmission lines, characteristics of common waveguides, resonant cavities, Smith chart, design of coaxial and waveguide systems, Lorentz reciprocity, simple antennas, design of linear antenna arrays. May be taken for graduate credit by students majoring in fields other than electrophysics. Prerequisite: EE 32. (Fall)
- 134 **Optics and Optical-Fiber Systems Design** (3) Kahn and Staff  
Introduction to the design of optical systems. Review of geometric optics, rays, and waves. Types of optical fibers, index and gradient index. Structure of beam waveguides. Gaussian beams. Design of lasers. Coherence and polarization, holographic systems. Fourier transforms and optical filtering. Coupled modes. Design of optical components. Prerequisite: ApSc 114; EE 32. (Spring)
- 143 **Elements of Communications Engineering Design I** (3) Newman and Staff  
Signal analysis: Fourier transforms, power spectrum; principles of modulation, amplitude, frequency, and pulse modulation. Comparison of analog and digital transmission. Time and frequency division multiplexing. Random signals and noise. Transmission systems for cable, radio, satellite, and optical links. Prerequisite or concurrent registration: EE 121. (Fall)
- 144 **Elements of Communications Engineering Design II** (3) Newman and Staff  
Statistical theory of communications. Comparison of communications systems in noisy channels. Data communications, design of modems. Concept of information theory. Coding for noisy channels. ARQ and forward error control. Communications protocols. Elements of traffic theory. May be taken for graduate credit by students in fields other than communications. Prerequisite: EE 143. (Spring)
- 146 **Communications Design Laboratory** (1) Saha and Staff  
Experiments in support of the design of communications systems with emphasis on Fourier analysis, sampling theorem, filtering and aliasing, amplitude and frequency modulation, quantization and pulse code modulation, delta modulation, binary phase shift keying, quadrature phase shift keying. Prerequisite or concurrent registration: EE 64, 143. (Fall and spring)
- 147 **Data Communications Design Laboratory** (1) Saha and Staff  
Experiments in support of the analysis and design of communications systems with emphasis on network protocols. Time and frequency division multiplexing, flow control, automatic repeat request, interfacing, token ring, token bus, multiple access for Ethernet, routing, packet switching. Prerequisite or concurrent registration: EE 144, 146. (Spring)
- 160 **Electrical Measurements and Instrumentation** (3) Heller and Staff  
Measurements of current, voltage, power, resistance, capacitance, inductance, energy, phase angle, frequency, and time. Measurements of high-frequency signals. Analog-to-digital conversion techniques; control of measurement and instrumentation systems. Transducer characteristics and analog signal processing instrumentation. Prerequisite: EE 32, 121; CSci 150. (Spring)
- 163 **Senior Electrical Engineering Design Project Laboratory I** (3) Meltzer and Staff  
Conception and design of a one-year project to be completed in EE 164. Performance of a market survey and economic analysis of the product. Completion of the preliminary design. Prerequisite: EE 67 and senior status; prerequisite or concurrent registration: EE 122, 143. (Fall)
- 164 **Senior Electrical Engineering Design Project Laboratory II** (3) Meltzer and Staff  
Completion, construction, and demonstration of the project started in EE 163. Oral presentation, including visual aids, of the project. Formal written report on the project. Written assignments to enhance the ability to write technical reports. Prerequisite: EE 163. (Spring)
- 166 **Electrical Power Laboratory I** (1) Harrington and Staff  
Experiments in support of the analysis and design of electrical power systems. Measurements of the characteristics of devices to generate electric power. Rectification and inversion processes for power systems and drives. Prerequisite or concurrent registration: EE 67, 177. (Fall and spring)

- 167 Electrical Power Laboratory II (1)** Harrington and Staff  
Speed and torque control of AC and DC motors. Use of computers in the laboratory to perform such control. Applications of computer control to frequency and voltage control in power systems. Prerequisite: EE 166. (Fall and spring)
- 168 Microwave and Laser Engineering Laboratory (1)** Wasyliwskyj and Staff  
Experiments in support of analysis and design of transmission lines, microwave components, microwave systems, fiber-optic systems, antennas and antenna arrays. Introduction to the characteristics of laser and optical systems. Prerequisite: EE 67, 133, 143. (Spring)
- 169 Advanced Electronics Design Laboratory (1)** Heller and Staff  
Experiments in the analog operation of electronic devices. Characteristics of nonlinear operation of electronic devices. Use of electronic devices in communication equipment. May be taken for graduate credit by graduate students who are not majoring in energy conversion, power, and transmission. Prerequisite: EE 32, 67; prerequisite or concurrent registration: EE 121, 122. (Fall)
- 171 Optics and Laser Engineering Laboratory (1)** Kahn and Staff  
Introduction to the design of optical systems. Experiments describing geometric and Fourier optical systems. Use of fiber-optical components. Experiments on polarization, holography, and optical filtering. Characteristics of lasers and optical components. Concurrent registration: EE 134. (Spring)
- 172 Control Systems Design (3)** Kyriakopoulos and Staff  
Mathematical models of linear systems; steady-state and transient analyses; root locus and frequency response methods; synthesis of linear feedback control systems. Prerequisite: ApSc 114, EE 12 or ME 134. (Spring)
- 176 Control Systems Laboratory (1)** Carroll and Staff  
Experiments in support of control theory, involving the use of the digital computer for process control in real time. Design of feedback and compensation with computer implementation. Digital simulation of linear and nonlinear systems. Prerequisite or concurrent registration: EE 67, 172 or equivalent. (Spring)
- 177 Electrical Energy Conversion (3)** Harrington and Staff  
Fundamentals of electromechanical energy conversion. Electromechanical transducers and their equivalent circuits, three-phase and single-phase AC rotating machines, DC machines, rotating machines as circuit elements. Prerequisite: EE 12, 31. (Fall and spring)
- 178 Electrical Power Systems (3)** Harrington and Staff  
Introduction to electrical power systems; transmission and distribution of electrical power, three-phase circuits, symmetrical components, fault analysis. Voltage, current, and power limitations. Analysis of lightning and switching surges in power systems. Protective devices—switchgear, arresters, and isolators. May be taken for graduate credit. Prerequisite: EE 177 and senior status. (Fall)
- 184 Introduction to Medical Engineering (3)** Eisenberg and Staff  
Terminology of the medical profession; physiology of the human body, from overall systems or functional approach; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. May be taken for graduate credit by students in fields other than medical engineering. (Spring)
- 186 Medical Engineering Laboratory (1)** Loew and Staff  
Experiments in support of instrumentation used in medicine and biology; safety considerations. Acquisition and measurement of physiological signals, EKG, EEG, evoked potentials. Processing of signals derived from physiological measurements. Concepts in telemetry of medical signals. Prerequisite or concurrent registration: EE 32, 66, 121, 184. (Spring)
- 192 Robotic Systems Design and Applications (3)** Carroll and Staff  
Modeling and analysis of robot designs. Kinematics of mechanical linkages, structures, actuators, transmissions, and sensors. Design of robot control systems, computer programming, and vision systems. Use of artificial intelligence. Current industrial applications and limitations of robotic systems. Prerequisite: computer programming, ApSc 58, EE 172 or ME 182. (Fall and spring)
- 196 Robotics and Automation Laboratory (1)** Carroll and Staff  
Experiments illustrating basic principles and programming of robots and other automated machinery. Design and writing of computer programs to use a robot's arm, vision, and data files to accomplish tasks. Prerequisite or concurrent registration: EE 192/ME 197. (Spring)



- 197 Special Topics in Electrical Engineering (1 to 3)** Staff  
Topic to be announced in the *Schedule of Classes*. (Fall and spring)
- 198 Research (1 to 3)** Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## COMPUTER SCIENCE

- 10 Word Processing, Database Management, and Spreadsheet Applications (3)** Heller and Staff  
Introduction to the use of microcomputer hardware and software for word processing (e.g., WordPerfect), spreadsheets (e.g., Quattro), and database management (e.g., dBase III), with emphasis on the use of microcomputers to solve typical problems in academia and business. May not be counted toward degree requirements by majors in the department. (Fall and spring)
- 30 Computer Literacy (3)** Martin and Staff  
For students whose majors are not electrical engineering or computer science. Survey of computers and languages, introduction to BASIC programming, history of computing, the effect of computers on our lives, uses for computers. May not be counted toward degree requirements by majors in the department. Prerequisite: high school algebra. (Fall and spring)
- 50 Computing for Engineers and Scientists (3)** Martin and Staff  
Structured programming with high-level language using FORTRAN. Control structures. Different data types with emphasis on real and complex number computations. Arrays used with vector and matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Prerequisite or concurrent registration: Math 31. (Fall and spring)
- 51 Introduction to Computing (3)** Martin and Staff  
Introduction to the solution of problems on a digital computer using Pascal. Structured programming concepts; peer review and proper documentation techniques; efficiency of programs; design of test data. Writing, debugging, and running programs in an interactive computing environment. Prerequisite or concurrent registration: Math 31 or permission of instructor. (Fall and spring)
- 53 Technology and Society (3)** Martin and Staff  
The social impact of the information age. Privacy, piracy, automation, reliability of socially critical systems, role of simulations in decision making and computer crime. Professional software tools such as word processing, graphics packages, databases, and spreadsheets. Professional ethics. Communication skills. Prerequisite: CSci 50 or 51. (Spring)
- 54 Programming Laboratory (1)** Martin and Staff  
Advanced programming techniques, including efficiency and complexity of programs, dynamic data structures, and recursion. Design and implementation of a large programming project, using the programmer team model. Prerequisite: CSci 51 or permission of instructor. (Fall and spring)
- 57 Assembly Language Interfacing (1)** Meltzer and Staff  
Introduction to the architecture of a microcomputer. The instruction set of a microcomputer. Programming the microcomputer in assembly language. Methods of addressing and control. Types of instructions. I/O for a microcomputer. Prerequisite: CSci 50. (Fall and spring)
- 100 Introduction to Programming (3)** Martin and Staff  
Intensive introductory course for students with a science, mathematics, or other quantitative background. Solution of numerical and nonnumerical problems on a digital computer using FORTRAN and Pascal. Recommended for graduate and advanced undergraduate students in other departments. Prerequisite: Math 32 or equivalent. (Fall and spring)
- 120 Assembly Language Programming I (3)** Maurer and Staff  
Programming of microcomputers in machine and assembly language. Number systems and codes. Architectures of various microcomputers. Methods of addressing and machine control. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 51 or equivalent. (Fall and spring)
- 131 Programming and Data Structures (3)** Feldman and Staff  
Data structures used in computer programming and algorithms. Use of tree structures, arrays, lists, stacks, files, strings, and linked structures. Sorting,

- searching, hashing, and merging of data. Performance of algorithms using different data structures. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 51. (Fall and spring)
- 133 Discrete Structures for Computing (3)** Narahari and Staff  
Mathematics for computer science. Sets, functions, and sequences. Propositional and predicate calculus, formal proofs, mathematical induction. Matrices, semigroups, groups, and isomorphism. Relations, partitions, equivalence relations, trees, graphs. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 51, Math 32. (Fall and spring)
- 140 Design of Switching Systems I (3)** Friedman and Staff  
Switching logic, combinational and sequential circuits. Number systems and codes, binary arithmetic, Boolean algebra. Minimization techniques. Combinational circuits, programmable logic, synchronous sequential circuits. May be taken for graduate credit except by majors in computer science. (Fall and spring)
- 142 Theoretical Foundations of Computing (3)** Choi and Staff  
Ordering, formal grammars, finite-state machines, equivalence of machines, reduction, finite-state languages, acceptors, regular expressions, pushdown automata, context-free languages, Turing machines, computability. Prerequisite: CSci 133; concurrent registration: CSci 144. (Spring)
- 144 Concepts of Programming Languages (3)** Heller and Staff  
Concepts and comparisons of data types, syntax, semantics, recursion, binding times, sequence and data control, run-time resources, translators, and storage of program languages. Team programming. May be taken for graduate credit except by students in computer science. Prerequisite: CSci 120 or 157, 131. (Fall and spring)
- 145 Software Laboratory I (1)** Rotenstreich and Staff  
Computer-programming projects designed to supplement the theory and programs of CSci 144 and 148. Students write structured programs and use proper documentation. Prerequisite or concurrent registration: CSci 148. (Fall)
- 146 Software Laboratory II (1)** Rotenstreich and Staff  
Computer-programming projects designed to supplement the theory and programs of CSci 156. Team projects to design new I/O drives and similar projects involving operating system modules. Structured programming and proper documentation techniques. Prerequisite or concurrent registration: CSci 156. (Spring)
- 148 Theory of Computer Translators (3)** Feldman and Staff  
Lexical and syntax analysis, regular expressions, context-free grammars, parsing techniques, top-down parsing, efficient parsing, syntax-directed translation, intermediate formats, flow of control, block structures, procedure calls, symbol tables, run-time storage, error-detection and recovery, code optimization, code generation. Prerequisite: CSci 142. (Fall and spring)
- 155 Introduction to Numerical Methods for Computers (3)** Youssef and Staff  
Numerical methods for solving simultaneous linear equations, roots of equations, eigenvalues and eigenvectors, numerical differentiation and integration, interpolation, solution of ordinary and partial differential equations, and curve fitting. May be taken for graduate credit. Prerequisite: ApSc 113, 115; CSci 51 or equivalent; a course in high-level computing. (Fall)
- 156 Introduction to Operating Systems (3)** Rotenstreich and Staff  
Process management, process state, concurrent processing, synchronization, events. Operating system structure, the kernel approach, processor scheduling, task switching, monitors. System management, memory management, process loading, communication with peripherals. File systems. Interactive computation. Prerequisite: CSci 144. (Fall and spring)
- 157 Assembly Language Programming II (3)** Maurer and Staff  
Introduction to the instructions and directives of the 8086 family. Macros and conditional assembly. I/O operations in assembly language. Segmenting large programs. Use of an operating system. Includes a term project. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 120 or equivalent. (Fall and spring)
- 162 Design of Switching Systems II (3)** Zaghloul and Staff  
Analysis of symmetric, unate, and threshold functions: Boolean difference and decomposition. Timing in sequential circuits, essential hazards, races in sequen-



- tial circuits. Design for testability. Designing using PLDs. Introduction to ASIC design techniques. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 140 and EE 122. (Spring)
- 163 **Senior Computer Science Design Project Laboratory I** (3) Della Torre and Staff  
Conception and design of a one-year project in hardware and/or software to be completed in CSci 164. Performance of a market survey and economic analysis of the product. Completion of the preliminary design. Prerequisite: EE 122; CSci 144; and senior status. (Fall)
- 164 **Senior Computer Science Design Project Laboratory II** (3) Della Torre and Staff  
Completion, construction, and demonstration of the project started in CSci 163. Oral presentation of the project, including visual aids. Formal written report on the project. Written assignments to enhance ability to write technical reports. Prerequisite: CSci 163. (Spring)
- 165 **Sequential Circuit Laboratory** (1) Zaghoul and Staff  
Threshold circuits and asynchronous sequential circuits. Testing for faults in logic networks. Circuits using program logic devices. Use of design automation programs in designing sequential machines. Prerequisite or concurrent registration: CSci 140, 162; EE 66, 67, and 122. (Spring)
- 166 **Computer Engineering Laboratory I** (1) Meltzer and Staff  
Experiments in support of the theory and design of microprocessor and micro-computer hardware and software. Use of microprocessors in control of systems. Use of simulators, cross-compilers, and development systems. Prerequisite or concurrent registration: EE 67; CSci 120, 140. (Fall)
- 167 **Computer Engineering Laboratory II** (1) Meltzer and Staff  
Class project, using a team approach in designing the subsystems needed to produce a complete digital computer system. Includes experience in software development, techniques for buses and local area networks, and design of I/O and memory subsystems. Prerequisite or concurrent registration: CSci 156, 166. (Spring)
- 168 **Computational Methods for Simulation** (3) Bock and Staff  
Computational methods for continuous and discrete system simulation. Effects of computer software and hardware architectures on computational precision and accuracy requirements. Random-number generation and testing. Calibration and scaling technique. Verification and validation technique. Prerequisite: CSci 144, 155. (Spring)
- 172 **Introduction to Design of Computers** (3) Alexandridis and Staff  
Information and control flow, instruction sequencing. Processor structure, operation, arithmetic. Buses and systems configurations. Memory subsystem. Programmed I/O, interrupts, and DMA structures. Small computer architectures. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 120, 140. (Fall and spring)
- 174 **Symbolic and Logic Processing for Artificial Intelligence** (3) Garcia and Staff  
Abstraction of process and data with list structures. Functional programming. Changes in the state of objects and processes. Environments. Streams. Messages. LISP and PROLOG interpreter models using EVAL and APPLY. Symbolic logic and formal inference; unification and resolution. May be taken for graduate credit. Prerequisite: CSci 144. (Fall and spring)
- 175 **System Software and Software Engineering** (3) Rotenstreich and Staff  
Macroassemblers, library management, linkers and loaders. Control of I/O via access methods. Requirements definition, modularity, structured design, data specifications, functional specifications, verification, documentation, software maintenance. Program design methods. Software tools. Software project organization, design teams, quality assurance. Prerequisite: CSci 156. (Fall)
- 178 **Introduction to Database Management** (3) Rotenstreich and Staff  
Design and architecture of database systems. Query formulation, data models, data structures to minimize access time, relational data structures. Construction of a database management system. Survey of existing systems. Prerequisite: CSci 144. (Spring)
- 182 **Digital Computer Architecture** (3) Meltzer and Staff  
Methods of describing computer systems. Speed-up techniques in arithmetic units. High-speed central processors. Stack architecture. The storage hierarchy, virtual memory systems, and cache systems. Control units and microprogramming design. May be taken for graduate credit. Prerequisite: CSci 144, 172. (Fall and spring)

**185 Interactive Computer Graphics I (3)**

Sta

Two-dimensional interactive computer graphics. Hardware; concepts of graphics subroutine packages; programming concepts for interaction, display, and data structuring; basic clipping and scan-conversion algorithms; two-dimensional homogeneous coordinates. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 144, 182. (Spring)

**188 Distributed Computing Systems (3)**

Meltzer and Staff

Connection of microprocessors and minicomputers into a distributed computing system. Use of shared memory and distributed databases. Synchronization problems and concurrency in distributed systems. Shared bus structure, loop and token passing. Geographically distributed systems. Computer networks. Local area networks. Prerequisite: CSci 154, 175. (Spring)

**197 Special Topics in Computer Science (1 to 3)**

Staff

Topic to be announced in the *Schedule of Classes*. (Fall and spring)

**198 Research (1 to 3)**

Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

**ENGINEERING MANAGEMENT**

Programs in engineering management are offered at the graduate level by the School of Engineering and Applied Science. The courses listed here are open to undergraduates.

**150 Introduction to Engineering Management (3)**

Silverman and Staff

Interrelationships of engineering, science, and management; interaction among individuals and groups in the engineering environment. Typical activities of engineering managers, motivations of engineers, engineers as managers. (Fall, spring, and summer)

**160 Introduction to Engineering Economic Analysis (3)**

Steiner and Staff

Economic decisions, equivalence, mathematics of finance, present worth, annual cost or profit, internal rate of return, cost-benefit ratio, incremental analysis, multiple alternatives, economic decisions under risk, inflation, depreciation methods, balance sheets, profit and loss statements, the accountant's view, and before- and after-tax analysis. (Fall, spring, and summer)

**170 Basic Quantitative Methods for Engineering Management (3)**

Staff

Introduction to quantitative tools and techniques important in engineering management. Concepts of probability and statistics, and their applications. (Fall, spring, and summer)

**ENGINEERING SCIENCE**

See Civil, Mechanical, and Environmental Engineering.

**ENGLISH**

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz, J.A. Quitslund, C.W. Stein (Chair), D. McAleavey, C. Tate, O.A. Seavey

Associate Professors G.R. Bozzini, R.L. Combs, G. Carter, A. Romines, K. Moreland, D. Moshenberg

Associate Professorial Lecturer E.R. Garner

Assistant Professors M.V. Dow, M.S. Soltan, J.L. Porter, C. Sponsler, F. Moskowitz, T.G. Wallace, M. Alcorn, M.D. Clair, D. Scarboro, S.P. Willens (Visiting), J. Mancini (Visiting), D.M. Carter (Visiting), N.W. Whichard (Visiting), P. Cook, J.M. Green (Visiting)

Assistant Professorial Lecturers E.T. McClay, K.L. Levenback

Lecturers J. Bolz, D.A. Bruno, J.C. Carlberg

Jenny McKean Moore Writer in Washington P. Medina

*Bachelor of Arts with a major in English*—The following requirements must be fulfilled

1. The general requirements stated under *Columbian College of Arts and Sciences*.  
2. Prerequisite courses—Engl 51-52 or 61-62 or 71-72; or Hmn 1, 2.

3. Required courses in related areas—(a) 12 credit hours or equivalent of Greek, Latin, Hebrew, French, German, Italian, Russian, or Spanish language study at the college level; (b) 6 credit hours of philosophy, religion, and/or mythology; (c) 6 credit hours of history (English, American, European, or world).



4. Required for the major—Engl 120 and 27 credit hours of 100-level courses (of which no more than 8 hours may be taken in creative writing or composition), including at least one course from each of the following categories:

1. Major authors (Engl 112, 127, 128, 130, 171).
2. British and American literature before 1800 (Engl 112, 113, 125, 130, 131, 132, 153, 155, 160).
3. 19th-century British and American literature (Engl 133, 134, 135, 136, 154, 161, 162, 163, 167).
4. 20th-century British and American literature (Engl 137, 138, 139, 140, 157, 158, 164, 165, 166, 168, 177, 178).

With departmental approval, courses with appropriate subject matter may be taken in place of those specified above. Students take 15 additional hours of 100-level courses, of which 6 may be in literature in a foreign language.

Students wishing to concentrate their course work on the study of American literature should take Engl 160 and two courses on the 19th century (either 161 and 162 or 163 and 167); at least one 100-level course in English literature; and 15 additional hours of 100-level courses in the department, of which at least 9 should be in American literature.

**Special Honors**—Majors who wish to be considered for Special Honors must meet the general honors requirements listed under **Regulations**: have maintained a 3.0 grade-point average; and apply for admission to the program, in writing, by October 1 of the junior year. Once admitted, the candidate must enroll in Engl 195 in the spring semester and in Engl 196 in the following fall semester. During the junior year, candidates must continue to maintain a 3.0 overall grade-point average and a 3.25 average in courses in the English Department. Subject to departmental approval, the candidate enrolls in Engl 198 in the spring semester of the senior year. To be eligible for graduation with Special Honors, candidates must earn at least a B on the Honors Thesis and have achieved a 3.40 grade-point average in courses in the English Department.

**Minor in English**—6 hours of introductory literature courses and 15 hours of 100-level literature courses, chosen in consultation with an advisor in the department.

**Minor in creative writing**—Engl 81, 6 hours of introductory literature (e.g., Engl 51–52), and 12 hours of 100-level courses offered by the department, of which at least 9 must be in creative writing.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** Engl 9 or 10 is prerequisite to all other courses in English. A 6-credit-hour literature survey, such as Engl 51–52, 61–62, 71–72, or any pair of courses listed under the general curriculum requirement in literature, is prerequisite for admission to all 100-level courses in English except Engl 102, 110, 115, 160, 161, and 162.

Scores on the College Board English Composition Achievement Test, the Test of Standard Written English, or the English component of the American College Testing battery determine placement in Engl 9 or 10 and eligibility to waive the requirement, according to the following schedule:

Achievement Test		TSWE		ACT	Placement
650 and above	or	58 and above	or	28 and above	Waives Engl 10
500–649	or	40–57	or	20–27	Engl 10
499 and below	or	39 and below	or	19 and below	Engl 9

The admission of international students to any English course is determined by the EFL Placement Test. Students should apply to the office of English as a Foreign Language to take this test (see Students from Foreign Institutions, under Admissions).

## EXPOSITORY WRITING

- 9 **English Composition: Language as Communication** (3) Moshenberg and Staff  
Includes content of Engl 10; offers the advantage of more intensive work on analytical reading and on fluency and control in the writing process. Class meets five hours per week. Special fee, \$25. (Fall and spring)

- 10 English Composition: Language as Communication (3)** Moshenberg and Staff  
Critical examination of what language can do and what student writers can do with language; analysis of various kinds of discourse, focusing on their pragmatic and psychological dimensions. Emphasis on the writing process, with guidance in revising toward clear, effective, and engaging prose. (Fall and spring)
- 11 English Composition: Language and the Arts and Sciences (3)** Moshenberg and Staff  
Prepares the student to participate critically in the diverse, interpretative community of the university. Provides training in the analysis of literary and/or nonliterary texts, with emphasis on logic, values, and context. Focuses primarily on the polemic nature of writing and thought. Texts and course topics vary from section to section. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 13. (Fall and spring)
- 13 English Composition: Language and Ideas (3)** Staff  
Study and practice of expository and argumentative techniques; emphasis on the rhetorical problems raised by various intellectual disciplines and historical milieus. A substantial research paper is required. Prerequisite: Engl 9 or 10. To be taken only in conjunction with Hmn 1. Students who receive credit for Engl 13 cannot receive credit for Engl 11. (Fall and spring)
- 20 The Writing of Reports (3)** Staff  
Theory and practice in the writing of technical reports. Prerequisite: Engl 11. Offered off campus only.
- 101 Advanced Writing (3)** McClay and Staff  
Individualized instruction and frequent conferences; writing projects vary with each student according to needs and interests. Emphasis on developing professional work habits. Prerequisite: Engl 11 or 13, or written permission of instructor. Class size limited to 15 students. (Fall and spring)
- 102 Written Communications in Accounting (3)** Bozzini and Staff  
Analysis of communications by accountants and managers; frequent writing assignments, with emphasis on effective form and language in memoranda, letters, reports. Major in accountancy not required. Prerequisite: Engl 11 and junior status. Class size limited to 15 students. (Fall and spring)
- 110 Writing in Engineering and the Sciences (3)** Staff  
Study of writings by engineers and scientists who have considered the implications of technology in the modern world. Concurrently, study and practice of the communication skills needed for careers in engineering and the sciences. Prerequisite: Engl 9 or 10 or EFL 50; junior, senior, or graduate status. Material fee, \$5. (Spring)
- 111 Preparation for Peer Tutors in Writing (3)** Moreland  
For undergraduates accepted as tutors in the Writing Center: study and practice of techniques for prewriting, writing, and revision; readings on collaborative learning, the composing process, composition theory, critical thinking, and the teaching of writing; observation and exercises in writing, peer review, and tutoring. (Fall)

### CREATIVE WRITING

- 81 Introduction to Creative Writing (3)** Moskowitz and Staff  
An exploration of genres of creative writing (fiction, poetry, and/or playwrighting). Basic problems and techniques; examples of modern approaches; weekly writing assignments; workshop and/or conference discussion of student writing. Prerequisite: Completion of English composition requirement. Limited to 18 students. Material fee, \$15. (Fall and spring)
- 103 Intermediate Fiction I (3)** Moskowitz and Staff  
The writing of fiction. Prerequisite: Engl 81 or equivalent. Limited to 15 students. Material fee, \$15. (Fall)
- 104 Intermediate Poetry I (3)** McAleavey, Clair, Bolz  
The writing of poetry. Prerequisite: Engl 81 or equivalent. Limited to 15 students. Material fee, \$15. (Fall)
- 105 Intermediate Playwriting I (3)** Staff  
Same as TrDa 105. The writing of plays. Prerequisite: Engl 81 or equivalent. Limited to 15 students. Material fee, \$15. (Fall)



**106 Intermediate Fiction II (3)**

Moskowitz

The writing of fiction. Prerequisite: Engl 103 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. Material fee, \$15. (Spring)

**107 Intermediate Poetry II (3)**

McAlevey, Bolz, Clair

The writing of poetry. Prerequisite: Engl 104 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. Material fee, \$15. (Spring)

**108 Intermediate Playwriting II (3)**

Staff

Same as TrDa 108. The writing of plays. Prerequisite: Engl 105 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. Material fee, \$15. (Spring)

**181 Creative Writing Workshop (3)**

Taught by the Jenny McKean Moore Writer in Washington; open to undergraduates and graduate students. Prerequisite: a 100-level creative writing course. May be repeated for credit, if taught by a different instructor. Limited to 18 students. Material fee, \$15. (Fall and spring)

**ENGLISH AND AMERICAN LITERATURE****51-52 Introduction to English Literature (3-3)**

Paster, Plotz, and Staff

Representative works by major authors studied in their historical context; discussion of recurrent themes and introduction to various types and forms of imaginative literature. Engl 51: Middle Ages through the 18th century. Engl 52: 19th and 20th centuries. (Academic year)

**61 Tragedy (3)**

Carter, Paster

Modes of tragedy as developed in drama, nondramatic verse, and prose fiction in literature from ancient to modern times—Book of Job to Beckett.

**62 Comedy (3)**

Carter

Modes of comedy as developed in drama, nondramatic verse, and prose fiction—Chaucer to Borges.

**71-72 Introduction to American Literature (3-3)**

Ganz, Combs, and Staff

Historical survey. Engl 71: From early American writing through Melville, Whitman, and Dickinson. Engl 72: From Twain, James, and Crane to the present. (Academic year)

**112 Chaucer (3)**

Sponsler

Chaucer's major works seen as exciting, lively texts from the modern perspective and as products of specific economic, social, and cultural trends of the late 14th century. Focus on *The Canterbury Tales*, read in the original Middle English. (Fall)

**113 Medieval Literature (3)**

Sponsler

Readings from a wide range of medieval genres, including romances, saints' legends, mystical narratives, lyrics, civic drama, and social satires, to explore some of the principal concerns of medieval culture. How these texts responded to and shaped the changing patterns of medieval culture, as the clergy, the aristocracy, and the urban bourgeoisie attempted to define a culture of their own.

**115 History of the English Language (3)**

Sponsler

A sociolinguistic approach to the history of the English language. The development of the language from Proto-Indo-European through Anglo-Saxon and Middle English; how the various dialects of modern English were shaped and how a normative "standard" English was established. Emphasis on the social contexts and cultural implications of these changes.

**120 Critical Methods (3)**

Paster, Plotz, Romines, Sponsler

The topics and techniques of literary analysis, applied to English and American poetry, prose fiction, and drama. Attention to prosody, stylistic and structural analysis, narratology, and critical theory applied to specific literary texts.

**123 Approaches to Interpretation of Literary Texts (3)**

Carter, Soltan

Historical study of poetics and interpretation, from the classical tradition (Aristotle, Sidney, Johnson) and Romanticism (Wordsworth, Coleridge, Shelley) to the modern era (Arnold, Eliot, Ortega y Gasset) and some contemporary critics (e.g., Bloom, Derrida).

**125 The English Renaissance (3)**

Quitslund

Verse and prose, chiefly from the period 1575-1625, seen in relation to continental culture and the social institutions that shaped the development of English

- culture. Sidney, Spenser, Shakespeare, Campion, Donne, Jonson, Bacon, Herbert, others; emphasis on the development of several literary styles and on adaptation of genres to suit changes in private and social experience.
- 127-28 **Shakespeare (3-3)** Paster  
Close study of seven or eight plays each semester, with emphasis on the texts in history and ideology. Survey of current critical practices (feminist, materialist, psychoanalytic) and deconstruction of Shakespeare as a cultural institution. (Academic year)
- 130 **Milton (3)** Cook  
Study of the major works in verse and prose, following the course of Milton's career. (Spring)
- 131-32 **The 18th Century: Literature and Authority (3-3)** Wallace  
Readings in significant 18th-century English writers—Dryden, Swift, Pope, Johnson, and others—with emphasis on tracing the ways in which literary texts contain, perpetuate, and subvert social and political ideologies. (Academic year)
- 133-34 **The Romantic Movement (3-3)** Combs, Plotz  
Major figures and topics in English and Continental romanticism. Engl 133: Blake, Wordsworth, Coleridge, Lamb, and others. Engl 134: Byron, Shelley, Keats, Hazlitt, DeQuincey, and others. (Engl 133—fall)
- 135-36 **Victorian Literature (3-3)** Carter  
Engl 135: 1830-1865—E. Brontë, Dickens; Tennyson, Browning, Arnold; Darwin, Carlyle, Ruskin. Engl 136: 1865-1900—Eliot, Hardy, Conrad; Swinburne, the Rossettis, Morris; Pater, Wilde, the Nineties. (Engl 135—fall)
- 137-38 **Modernism and Anti-Modernism (3-3)** Maddox, Soltan  
Engl 137: the emergence of modernist experimentation (and the sense of epistemological and moral crisis it expressed) in the poetry and prose of Pound, T.S. Eliot, Woolf, Kafka, and others. Engl 138: the reaction against modernist styles and themes in the wake of World War II, as seen in the work of Orwell, Amla Lessing, Tournier, Larkin, and others. (Academic year)
- 139-40 **20th-Century Irish Literature (3-3)** Maddox  
Irish writers from the time of the Literary Revival in the late 19th century to the present. Engl 139: Yeats and other Irish poets and playwrights of his time and after—Synge, O'Casey, Kavanagh, Heaney, and others. Engl 140: Joyce through Ulysses and other fiction writers of later generations—O'Brien, Beckett, and others. (Academic year)
- 153-54 **The English Novel (3-3)** Maddox, Soltan, Wallace  
Engl 153: The 18th century—Defoe, Richardson, Fielding, Sterne, and others. Engl 154: The 19th century—Austen, the Brontës, Dickens, George Eliot, Hardy and others. (Academic year)
- 155-56 **The English Drama (3-3)** Paster, Haedick  
Engl 155: Shakespeare's contemporaries. Engl 156: Historical survey, 1660 to present. (Engl 155—fall)
- 157 **20th-Century Drama (3)** Paster, Haedick  
Representative continental, English, and American plays of the 20th century
- 160 **Early American Literature and Culture (3)** Seavey  
The shaping of America's early literary and cultural traditions as shown by significant writers of the Colonial and Early National periods: Bradstreet, Cotton Mather, Edwards, Franklin, Crèvecoeur, and others. Same as AmCv 160. (Fall)
- 161 **American Romanticism (3)** Sten  
The shaping of America's literary and cultural traditions as shown by significant writers of the Romantic period: Poe, Emerson, Hawthorne, Melville, Thoreau, Whitman, Dickinson, and others. Same as AmCv 161. (Spring)
- 162 **American Realism (3)** Romines  
The shaping of America's literary and cultural traditions as shown by significant writers of the Realist period: Twain, James, Crane, Howells, Wharton, Chopin, Robinson, and others. Same as AmCv 162. (Fall)
- 163-64 **American Poetry (3-3)** Ganz, Combs, McAleavey  
Close examination of major American poems. Engl 163: From the beginnings through the early 20th century: works by Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Robinson, Frost, and others. Engl 164: The 20th-century



modernist poets: Stevens, Pound, Williams, Eliot, Ransom, Cummings, Crane, and others. (Academic year)

165-66 **American Drama** (3-3)

Combs, McClay

Engl 165: The works of Eugene O'Neill and the dramatic techniques of Ibsen, Chekhov, and Strindberg that helped to shape 20th-century American drama.

Engl 166: The American theater, 1935-1982, including plays by Odets, Hellman, Saroyan, Wilder, Miller, Inge, Williams, O'Neill, McCullers, and Hansberry, and outstanding examples of musical comedy. (Academic year)

167-68 **The American Novel** (3-3)

Maddox, Seavey, Moreland

Historical and critical study of major works in the American novelistic tradition.

Engl 167: From beginnings through the 19th century: Hawthorne, Melville, James, Twain, Dreiser, and others. Engl 168: The 20th century: Wharton, Cather, Anderson, Hemingway, Fitzgerald, Faulkner, Wright, R.P. Warren, Nabokov, and others. (Academic year)

170 **The Short Story** (3)

Combs

An extensive survey of short fiction by a wide variety of writers of the 19th and 20th centuries, about half of them American; readings on the art of the short story by writers and literary critics included. (Spring)

171 **Major Authors** (3)

Staff

In-depth studies of two or three authors (of British, American, or other nationality) who have written in English. Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs.

172 **Selected Topics in Literature** (3)

Staff

Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs. Topics of projected courses include Jewish-American fiction; children's literature; southern literature; science fiction; literature and politics; literature and philosophy; Freud, Dostoevsky, and Shakespeare; literature of the Holocaust.

174 **Afro-American Literature** (3)

Tate

Study of texts representing the experiences of black Americans and the ideas and social forces that have shaped their lives and writings. Same as AmCv 174. (Fall)

175 **Gender and Literature** (3)

Romines, Tate

Symbolic representations of culturally defined roles and assumptions in literature. Male and female gender roles as fundamental to culture; the representation of culture, in literature especially and in the arts and humanities generally.

177-78 **Contemporary American Literature** (3-3)

Ganz

Major and representative works, 1946-1980. Engl 177: poetry, fiction, and non-fiction by Flannery O'Connor, Ginsberg, Kerouac, Rich, Lowell, Plath, Mailer, Roethke, Baraka, Berryman, Ashbery, and others. Engl 178: essay, short story, and novel: Warren, Salinger, Agee, White, Cheever, Nabokov, Welty, Wilder, Olsen, Bellow, McPhee, and others. (Academic year)

182 **A Writer's Perspective on Literature** (3)

Study of a literary topic, from the point of view of the Jenny McKean Moore Writer in Washington. May be repeated for credit. (Spring)

183 **Individualism, Reason, and Tradition**

Kennedy

in Early Modern Europe (3)

Same as Fren/Ger/Hist/Rel 183 and Art 187.

195-96 **Honors Seminar** (3-3)

Staff

Genre and genre theory; literature as cultural artifact and as instrument of cultural criticism; various critical approaches—ideological, historical, and ahistorical. Open only to second-semester junior and first-semester senior honors candidates in English. (Engl 195: spring; Engl 196: fall)

197 **Independent Study** (3)

Sten and Staff

For exceptional students whose academic objectives are not accommodated in regular courses. Students must obtain the chair's approval and arrange for supervision by an appropriate member of the department. (Fall and spring)

198 **Honors Thesis** (3)

Staff

Under the guidance of an instructor, the student writes a thesis on an approved topic. Open only to senior honors candidates in English. (Fall and spring)

## ENGLISH AS A FOREIGN LANGUAGE

Associate Professors G.R. Bozzini, S.M. Wright, C. Meloni

Assistant Professors F.C. Reid, E. Echeverria, M. Kirkland, S. Thompson, A.J.B. Covarrubias, J.K. Donaldson, Jr. (Director), P. Connerton, C.L. Iacobelli, M.A.P. Saunders, M.B. Bandas, P.N. Edmondson, R.W. Tucker, B.P. Tyndall, C. Matthews

This comprehensive program in English as a foreign language is designed for persons enrolled or planning to enroll in University credit programs, for members of Washington's international community, and for other individuals who wish to improve their command of English through an intensive or semi-intensive study program. International students entering the program must take the EFL Placement Test before registering for any EFL course. The program in English as a foreign language offers several noncredit special courses in addition to those listed below.

**Note:** In special cases and with the approval of the program, component parts of EFL 15, 20, 30, and 40 can be taken separately. Tuition rates and laboratory fees are charged accordingly.

- 15 **Intensive Basic English (0)** Covarrubias, Echeverria  
Introduction to basic grammar, vocabulary, and composition. Development of reading, speaking, and listening skills. Twenty class hours per week. Students registered in EFL 15 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$70.
- 20 **Intensive Lower-Intermediate English (0)** Wright, Bandas, Tyndall  
Continued study of basic grammar. Continued practice in speaking, listening, reading, vocabulary, and composition. Emphasis on integration of skills. Twenty class hours per week. Students registered in EFL 20 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$70.
- 30 **Intensive Intermediate English (0)** Connerton, Reid, Matthews  
Continued study of grammar; emphasis on complex structures. Further practice in reading, vocabulary, oral communication, and composition. Introduction to academic lectures and note taking. Twenty class hours per week. Students registered in EFL 30 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$35.
- 40 **Intensive Higher-Intermediate English (0)** Bandas, Kirkland, Meloni, Saunders, Thompson, Wright  
Continued practice in complex grammar and related language skills. Reading academic material; basic research techniques. Twenty class hours per week. Students registered in EFL 40 may not take additional academic work without approval of the advisor. General and technical sections are offered. Tuition is charged at the rate of seven credit hours; laboratory fee, \$35.
- 45 **Semi-Intensive Advanced English (0)** Edmondson, Tucker, Tyndall  
Emphasis on the research/writing process. Practice in reading university-level materials. Focus on revision and editing. Additional class sessions are offered in specialized skills. Ten class hours per week. Tuition is charged at the rate of five credit hours.
- 50 **English Composition/Research Methods for International Students (3)** Donaldson, Iacobelli, Meloni  
Composition and library research methods course for students who demonstrate high proficiency in English. Four class hours per week. This course can be taken by international students in lieu of Engl 9 or 10. Sections are offered with general academic and technical emphasis. Special fee, \$25.
- 60 **Advanced Oral Communication (3)** Echeverria  
For students who demonstrate high proficiency in English and wish to improve their public communication skills. Emphasis on interviewing, preparing and delivering informative and persuasive speeches, and leading and participating in small-group discussions. Four class hours per week. Special fee, \$25.
- 61 **American Language and Culture (3)** Echeverria, Covarrubias  
For students who demonstrate high proficiency in English. Advanced English language skills taught through a study of currents in American thought, culture, and civilization. Discussions are based on selected texts and periodical literature. Topics are highlighted by films, guest lecturers, and cultural activities. Four class hours per week. Special fee, \$25.



## ENVIRONMENTAL STUDIES

## Committee on Environmental Studies

H. Merchant (Chair), W.C. Parke, W.E. Schmidt, A. Viterito, A.M. Yezer

Columbian College of Arts and Sciences offers interdepartmental programs in environmental studies leading to the degree of Bachelor of Arts or Bachelor of Science. By emphasizing the social sciences, the program leading to the degree of Bachelor of Arts is designed to serve the student whose participation in the environmental decision-making process involves integrating information of a less technical nature. The program leading to the degree of Bachelor of Science prepares a student for a role in environmental decision making that involves the interpretation and use of technical information.

**Bachelor of Arts with a major in environmental studies**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses (qualified students may substitute advanced courses with departmental permission, in order to include more elective courses in their program):
  - (a) Statistics—Stat 91.
  - (b) Natural sciences—6–8 credit hours selected from BiSc 3–4, 11–12; Chem 11–12, 17–18; Geol 1–2; or Phys 1, 2, 5, 6. BiSc 3–4 must be passed with a grade of A or B to be accepted toward fulfilling the introductory natural science requirement.
  - (c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2; Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; or Soc 1, 2.
3. Required courses for the major (51 credit hours):
  - (a) BiSc 140; Econ 136; Geog 132.
  - (b) Eight credit hours selected from BiSc 101, 102, 103, 105, 107, 108, 109, 110, 111, 120, 123, 124, 125, 127, 128, 135, 141, 142, 143, 144, 145, 150, 166, 167, 168, 169, 185, 208, 242, 243; Chem 22, 50, 122, 151–52, 153–54; Geol 5, 105, 122, 125, 128, 141, 163; Phys 14, 15, 16, 127–28.
  - (c) 24 credit hours in courses selected from no more than two departments in the following—Anth 150, 151, 152, 171, 186, 187, 188, 263, 267, 273; Econ 101, 102, 105, 157, 158, 161, 199, 237; Envr 159–60, 161; Geog 106, 107, 108, 110, 127, 134, 135, 136, 137, 140, 143, 145, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144, 151, 156; Soc 120, 126, 127, 130, 143, 181.
  - (d) Envr 151–52, 157.

**Bachelor of Science with a major in environmental studies**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses (qualified students may substitute advanced courses, with departmental permission, in order to include more elective courses in their program):
  - (a) Statistics—Stat 91.
  - (b) Natural sciences—12–18 credit hours selected from BiSc 11–12; Chem 11–12, 17–18; Geol 1–2; Phys 1, 2, 5, 6. Either BiSc 11–12 or Chem 11–12 must be selected.
  - (c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2; Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; Soc 1, 2.
3. Required courses for the major (51 credit hours):
  - (a) BiSc 140; Econ 136; Geog 132.
  - (b) 23 credit hours selected from BiSc 101, 102, 103, 105, 107, 108, 109, 110, 111, 120, 123, 124, 125, 127, 128, 135, 141, 142, 143, 144, 145, 150, 166, 167, 168, 169, 185, 208, 242, 243; Chem 22, 50, 122, 151–52, 153–54; Geol 5, 105, 122, 125, 128, 141, 163; Phys 14, 15, 16, 127–28.
  - (c) 9 credit hours selected from Anth 150, 151, 152, 171, 186, 187, 188, 263, 267, 273; Econ 101, 102, 105, 157, 158, 161, 199, 237; Geog 106, 107, 108, 110, 127, 134, 135, 136, 137, 140, 143, 145, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144, 151, 156; Soc 120, 126, 127, 130, 143, 181.
  - (d) Envr 151–52, 157.

The science and social science courses listed under 3(b) and 3(c) above must be taken in not more than three departments. Not more than 6 hours of service-learning courses may count toward fulfilling requirements of the major.

In choosing elective courses for both the Bachelor of Arts and Bachelor of Science degree programs, students are reminded that, unless a secondary field of study is chosen, permission of the Dean of Columbian College of Arts and Sciences and the Committee on

Environmental Studies is necessary to take courses not offered by Columbian College Arts and Sciences, and a maximum of 9 credit hours of such courses may be taken. The following may be of interest to the environmental studies major: PAD 125; CE 194, 197; UPRE 153, 201. The permission of the instructor, the department chair, and the dean of the School of Business and Public Management is necessary to take graduate courses (numbered 201 and above) in that School. See the Graduate Programs Bulletin.

**151-52 Senior Seminar in Environmental Studies (3-3)**

Limited to majors in environmental studies. Directed reading and discussion of contemporary environmental problems.

**157 Introduction to Environmental Law (3)**

An introduction to selected pieces of major environmental legislation. The role of the courts and bureaucracy in implementing and interpreting legislation. Impact on decision making. Designed for students with no training in law.

**159-60 Field Experience (3-3)**

Open to juniors and seniors majoring in environmental studies. Students spend at least eight hours per week in a political, technical, legal, or special-interest organization working on environmental questions.

**161 Environmental Policy Internship (3 or 6)**

For students interested in environmental policy and decision making at the national level. The course consists of an internship with a federal agency or a public interest group concerned with environmental affairs, a weekly seminar based on directed readings, guest speaker presentations, and a major term paper (Summer)

## EXERCISE AND SPORT ACTIVITIES

See **Human Kinetics and Leisure Studies**.

## FINANCE

Professors F. Amling, T.M. Barnhill (Chair), W.E. Seale, W. Handorf  
Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Peyser, M.S. Klock  
Assistant Professors S.B. Jenkins, G.M. Jabbour, M. Humber (Visiting)

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration. Please note that the following courses were formerly offered by the Business Administration Department.

**120 Business Finance (3)**

Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, and cost of capital. Prerequisite: Accy 51-52; Econ 12; Mac 51-52; Stat 51. (Fall and spring)

**123 Investment and Portfolio Management (3)**

Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Fina 120. (Fall and spring)

**124 Advanced Financial Management (3)**

Analysis and readings covering applications of theory to financial management. Case studies for decision making involving working capital, capital budgeting, financing, dividend policy, and valuation. Prerequisite: Fina 120. (Fall and spring)

**130 Working Capital Management (3)**

The analysis of corporate short-term sources and uses of funds. Optimization techniques and case studies emphasized. Bank lending practices are evaluated within the working capital area. Prerequisite: Fina 120. (Spring)

**132 Real Estate Investment (3)**

Principles of real estate investment, including valuation, appraisal, financing, and development, in addition to a discussion of the mortgage market and institutions. Same as UPRE 132. Prerequisite: Fina 120. (Fall and spring)

**133 Fundamentals of Insurance and Risk Management (3)**

Functions of insurance and risk management in business enterprise. (Spring)



**135 Capital Formation (3)**

Handorf and Staff

The process of capital formation in a free enterprise economy. Roles of business firms, financial intermediaries, money and capital market institutions, governmental regulatory agencies, fiscal and monetary policies. Prerequisite: Fina 120. (Fall and spring)

**190 Special Topics (3)**

Staff

Experimental offering; new course topics and teaching methods.

**199 Individual Research (arr.)**

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

**FRENCH**

See Romance Languages and Literatures.

**GEOGRAPHY AND REGIONAL SCIENCE**

Professors J.C. Lowe, D.E. Vermeer (Chair)

Professorial Lecturers E. Marasciulo, B. Thomas, G.T. Foggia

Associate Professorial Lecturers J.A. Zinn, S.E.S. Mastran, W.B. Wood

Assistant Professors A. Viterito, M.W. Lewis, D.M. Hart, M.D. Price

Bachelor of Arts with a major in geography—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in the major—Geog 1, 2; ten 100-level geography and regional science courses to be chosen in consultation and with the approval of the undergraduate advisor. One course must be chosen from each of the following: Group A—Geog 108, 110, 132, 136; Group B—Geog 125, 126, 140, 141; Group C—Geog 127, 133, 145, 146; Group D—Geog 104, 105, 106, 107.

Minor in geography—Required: 21 credit hours, including Geog 1, 2, and one course from each of the following groups: Group A—Geog 127, 145, 146; Group B—Geog 125, 126, 141; Group C—Geog 108, 110, 137; Group D—Geog 132, 134, 135, 136; Group E—Geog 124, 140, 143.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**1 Introduction to Human Geography (3)**

Lowe, Lewis, Vermeer

A systematic survey of human geography; cultural perspectives on the use of space, including urbanization, geopolitics, and land use. (Fall and spring)

**2 Introduction to Environmental Geography (3)**

Price, Vermeer, Viterito

A systematic survey of environmental geography; perspectives on environments and human ecology, including ecosystems and their use, human population dynamics, and resource geography. (Fall and spring)

**3 The Physical Environment (3)**

Viterito

A study of the earth's physical environment, its systems, subsystems, and physical processes. Laboratory fee, \$30.

**104 Maps and Mapmaking (3)**

Staff

Descriptive and statistical techniques for thematic mapping; computer cartography. Laboratory fee, \$30.

**105 Techniques of Spatial Analysis (3)**

Viterito

Nature of geographical inquiry, approaches to the study of geography, empirical research methods.

**106 Geographic Information Systems (3)**

Viterito

Analysis of cartographic data structures and automated databases. Digitizing and plotting techniques. Laboratory fee, \$30.

**107 Remote Sensing and Air Photo Interpretation (3)**

Viterito

Remote-sensing techniques using aerial photography, color infrared, microwave, and satellite imagery. Application to rural and urban settings, archaeology, and environmental monitoring. Laboratory fee, \$30.

- 108 Weather and Climate (3)** Viterito  
An examination of atmospheric processes and climatic regions. Laboratory fee \$30. Prerequisite: Geog 2.
- 110 Climate and Human Ecology (3)** Viterito  
Effects of climate on human activities. Examination of human-induced climate change. Prerequisite: Geog 2.
- 120 World Regions: Problems and Prospects (3)** Lewis  
Understanding of world environmental and cultural regions; the natural and human conditions that undergird current problems and future prospects.
- 121 Computer Mapping (3)** Staff  
Analysis and application of computer mapping methods. Examination of FORTRAN and BASIC programming methods as they apply to cartography. Laboratory fee, \$25.
- 124 Urban Transportation (3)** Lowe  
The relationship between freight and passenger transportation systems and urban land use patterns and structure. Prerequisite: Geog 1.
- 125 Transportation and Communication (3)** Lowe  
The structure and evolution of transportation and communication networks and their impact on regional development. Prerequisite: Geog 1.
- 126 Location in Manufacturing and Agriculture (3)** Har  
Theories dealing with the location and dynamics of economic activities. Prerequisite: Geog 1.
- 127 Population and Settlement (3)** Har  
Patterns of world population; factors contributing to population pressures, growth, and migrations. Prerequisite: Geog 1.
- 132 Resource Management and Conservation (3)** Lewis  
The global distribution, utilization, and degradation of natural resources. Prerequisite: Geog 2.
- 133 People, Land, and Food (3)** Staff  
Spatial disparities in world food production, demand, and distribution; regional food-population balances; food supply problems and prospects. Prerequisite: Geog 1 or 2.
- 134 Energy Resources (3)** Prior  
Analysis of regional patterns and trends in consumption and production of energy resources. Examination of international energy linkages and energy policies of selected nations. Prerequisite: Geog 2.
- 135 Resources and Environmental Quality (3)** Lewis  
Investigations into questions of resource use and environmental quality. Emphasis on public policy and societal attitudes as they influence resource use. Prerequisite: Geog 2.
- 136 Water Resources (3)** Viterito, Lewis  
Analysis of the global spatial patterns, development, and use of water resources. Prerequisite: Geog 2.
- 137 Environmental Hazards (3)** Viterito  
Examination of natural hazards in terms of their types, distributions, and impacts on human activities. Prerequisite: Geog 2.
- 140 Urban Form and Dynamics (3)** Staff  
Analysis of the internal spatial structure of cities; emphasis on explaining patterns and dynamics of location within the city. Prerequisite: Geog 1.
- 141 Urban Settlement (3)** Har  
The location of cities, urbanization processes, theories and models of urban location and development. Prerequisite: Geog 1.
- 143 Urban Social Geography (3)** Lowe  
Behavioral perspectives on human spatial activities in cities. Prerequisite: Geog 1.
- 144 Explorations in Historical Geography (3)** Mondan  
Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country. Same as AmCv 144. (Spring)
- 145 The Cultural Landscape (3)** Lewis  
Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations. Prerequisite: Geog 1.
- 146 Politics in Place and Space (3)** Prior  
Interrelationships among the human and physical environment and political systems; the organization of political territories. Prerequisite: Geog 1.



- 147 Military Geography (3)** Staff  
An examination of environmental and locational factors and their impact on military planning and operations. Prerequisite: Geog 1 or 2.
- 151 Man and Land in North America (3)** Staff  
An examination of the social, environmental, and economic factors that have led to development of the several regions of the U.S. and Canada. Prerequisite: Geog 1 or 2.
- 154 Man and Land in the Middle East and North Africa (3)** Staff  
Cultural and physical regional patterns of the Middle East and North Africa. Prerequisite: Geog 1 or 2.
- 161 Man and Land in Latin America (3)** Price  
Examination of spatial characteristics of physical and cultural phenomena in Middle and South America. Prerequisite: Geog 1 or 2.
- 189-90 Readings in Geography (arr.)** Staff  
Prerequisite: 12 credit hours of geography and permission of instructor.
- 198 Special Topics (3)** Staff  
Consideration of geographic aspects of topical and future problems of society. May be repeated for credit provided that the topic differs. Prerequisite: Geog 1 or 2.
- 199 Internship (3)** Staff  
Fieldwork, internship, or other controlled assignment with an agency or organization engaged in work in applied geography. Prerequisite: 12 credit hours of geography courses and permission of instructor.

## GEOLOGY

Professors F.R. Siegel, A.G. Coates, R.C. Lindholm, J.F. Lewis, D.J. Stanley (Research), G.C. Stephens (Chair)  
Associate Professorial Lecturer J.H. Kravitz  
Assistant Professors R.P. Tollo, L.E. Osterman  
Assistant Professorial Lecturers F.J. Collier, G.B. Rabchevsky, M.K. Brett-Surman  
Lecturer R.T. Rye

Bachelor of Arts or Bachelor of Science with a major in geology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required introductory course—Geol 1-2.
3. Required courses in related areas—(a) Chem 11-12; (b) Math 30 (for the degree of Bachelor of Arts) or Math 30 and 31 (for the degree of Bachelor of Science); (c) Stat 91; and (d) BiSc 11 or 12 or Phys 1 (for the Bachelor of Arts) or BiSc 11 or 12 and Phys 1 (for the Bachelor of Science).
4. Required courses in the major—Geol 111, 112, 117, 118, 122, 151, and 261 (Sedimentology) for both the degrees of Bachelor of Arts and Bachelor of Science; Geol 166, 189, 195 for the Bachelor of Science degree only.

For graduation with Special Honors, a student must have an overall grade-point average of 3.3 plus the recommendation of the department; must take Geol 199 for 2 or 3 credit hours; and must submit an approved honors thesis or project report.

Minor in geology—18 credit hours selected with approval of the departmental advisor to undergraduates, including 6 hours of introductory geology (Geol 1-2; 5 and 105); two courses selected from Geol 101, 111, 122, 151; and two from Geol 124, 125, 128, 150, 261, or from requirements of the B.A. and B.S. (For students with special interdisciplinary interests, substitutions can be arranged.)

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

### 1-2 Introductory Physical and Historical Geology (3-3)

Stephens, Tollo, Lindholm, Osterman

Lecture (3 hours), laboratory (2 hours). An introduction to the principal features of the composition, structure, and history of the earth. Topics include nature of minerals and rocks, physical processes, energy resources, plate tectonics, origin of life, and evolution. Prerequisite to Geol 2: Geol 1 or 5. Laboratory fee, \$25 per semester. Credit will not be given for both Geol 1 and 5. (Academic year)

- 5 Environmental Geology (3)** Siegel, Lewis, Lindholm  
Lecture (2 hours), laboratory (2 hours). An introduction to the principal features of physical geology, with emphasis on the relation of people and society to natural environments; population evolution, natural hazards, and mineral resources; economic, legal, and political aspects. Laboratory fee, \$20. Credit will not be given for both Geol 1 and 5. (Fall and spring)
- 101 Rocks and Minerals (3)** Lindholm  
Lecture and laboratory; field trips as arranged. Identification of gemstones and other minerals, especially crystals. Classification and interpretation of rocks based on their minerals, textures, primary structures, and present-day processes. Field trips demonstrate rock structures and genetic associations. Prerequisite: Geol 1 or 5. Laboratory fee, \$20. (Spring)
- 105 Geological Hazards in Land-Use Planning (3)** Siegel  
Lecture and laboratory. An analysis of geological hazards and related factors that affect land-use planning. Field trip. Prerequisite: Geol 1 or 5, or permission of instructor. Laboratory fee, \$20. (Spring)
- 111 Mineralogy (4)** Toll  
Lecture and laboratory. Morphological crystallography and systematic mineralogy. Prerequisite: Geol 1; Chem 11 (may be taken concurrently); or permission of instructor. Laboratory fee, \$22. (Fall)
- 112 Optical Mineralogy (4)** Toll  
Basic light theory, optical characterization of minerals, thin section analysis. Prerequisite: Geol 111. Laboratory fee, \$26. (Spring)
- 117 Petrology (2)** Lewis  
Introduction to silicate phase systems; physics and chemistry of crustal and magmatic processes; volcanic processes and products. Prerequisite: Geol 1, 111, 112; Phys 1 or equivalent; or permission of instructor. (Fall)
- 118 Petrology Laboratory (2)** Lewis  
Concurrent registration in Geol 117 required for geology majors. Prerequisite: Geol 111 and 112. Laboratory fee, \$26. (Fall)
- 122 Structural Geology (4)** Stephenson  
Study of natural and experimental rock deformation and the relationships between stress and strain as recorded by geologic structures. Prerequisite: Geol 1-2. Laboratory fee, \$10. (Fall)
- 124 Geologic Map Interpretation (2)** Stephenson  
Interpretation and analysis of geologic maps and cross sections. Prerequisite: Geol 122. Laboratory fee, \$10. (Spring)
- 125 Marine Geology (3)** Kravitz  
Lecture and map work. Principles of oceanography and submarine geology; topography, crustal structure, sedimentary processes, and marine environments. Prerequisite: Geol 1 or permission of instructor. (Spring)
- 128 Geomorphology (3)** Rabchevsky  
Lecture (2 hours), laboratory as arranged. Nature and evolution of earth forms; principles of photointerpretation. Prerequisite: Geol 1. Laboratory fee, \$10. (Spring)
- 136 Introduction to Engineering Geology (3)** Lewis  
For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Phys 2 or equivalent, or permission of instructor. Laboratory fee, \$20. (Spring)
- 150 Dinosaurs: Evolution and Natural History (3)** Brett-Surman  
An introductory course on the natural history of dinosaurs—their evolution, biology, and ecology, their false portrayal in the press, and how scientists study them. (Spring and summer)
- 151-52 Invertebrate Paleontology (3-3)** Osterman, Collins  
Biology, taxonomy, functional morphology, and evolutionary patterns of the invertebrate fossil groups, with emphasis on the macroinvertebrates. Prerequisite: Geol 1-2 or permission of instructor. Laboratory fee, \$20 per semester (Academic year)
- 154 Vertebrate Paleontology (3)** Brett-Surman  
Lecture (2 hours), laboratory or field work as arranged. General features of vertebrate morphology and evolution; problems of paleoecology and adaptation. (Fall, odd years)



**186 Principles of Stratigraphy (3)**

Osterman

Fundamentals of stratigraphic principles and practice. Review of historical concepts, section measuring, vertical and lateral lithostratigraphic relationships, magnetic and climatic stratigraphy, biostratigraphic classification, zonation, correlation, geochronology, facies, and stratigraphic maps. Prerequisite: Geol 151-52 or permission of instructor. (Fall)

**189 Geophysics for Geologists (3)**

Stephens

Basic geophysics to assist the geologist mapping and solving geologic problems. Prerequisite: Geol 1-2; Math 31; Phys 1; or permission of instructor. (Spring)

**195 Field Methods (3)**

Tollo, Lindholm, Stephens

Weekend field trips. Methods of outcrop analysis, geologic mapping, and data interpretation. Students will be responsible for room and board expenses while at field camp (one week). Prerequisite: Geol 122. Laboratory fee (field trip fee), \$20. (Spring, odd years)

**199 Undergraduate Research or Reading (arr.)**

Staff

Problems approved by the staff. May be repeated once for credit. (Fall and spring)

**GERMANIC LANGUAGES AND LITERATURES**

Professors K. Thoenelt, C. Steiner (Chair)

Associate Professorial Lecturer G.A. Koskella

Assistant Professors B.M. Sachs (Visiting), P. Werres (Visiting)

Lecturer R. Gogolin

**Bachelor of Arts with a major in Germanic languages and literatures**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Ger 1-2, 3-4 (Ger 5-6 may be substituted), 9-10, 51-52, or equivalent.
3. Required courses in other areas—6 credit hours in one of the following subjects: art history, music history, philosophy, or history of Germany.
4. Requirements for the major—a minimum of 24 credit hours in 100-level German courses, including Ger 179-80; reasonable proficiency in speaking, reading, and writing German as determined by the department.

**Special Honors**—In addition to the general requirements stated under Regulations, a candidate for special honors in German must submit an acceptable senior thesis on an assigned topic.

**Minor in German**—Required: Ger 9-10, 51-52, and 6 credit hours of 100-level courses. Prerequisite: Ger 1-2, 3-4 (Ger 5-6 may be substituted), or equivalent.

**Placement Examination:** A student who has not been granted advanced standing and who wishes to continue in college the language study begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

**1-2 First-Year German (3-3)**

Staff

Structure of the German language; basic vocabulary, reading, writing, and conversation; the culture of German-speaking areas. Three hours in the classroom and one in the language laboratory each week. Laboratory fee, \$35 per semester. Prerequisite to Ger 2: Ger 1 or equivalent. (Fall and spring)

**3-4 Second-Year German (3-3)**

Staff

Continued study of the structure of the German language; vocabulary, reading, writing, and conversation; culture and literature of Germany, Austria, and Switzerland. Three hours in the classroom and one in the language laboratory each week. Laboratory fee, \$35 per semester. Prerequisite to Ger 3: Ger 1-2 or 5, or equivalent. Prerequisite to Ger 4: Ger 3 or equivalent. (Fall and spring)

**5-6 Intensive Beginning and Intermediate German (6-6)**

Koskella

Six hours in the classroom and two in the language laboratory each week. Ger 5 is equivalent to Ger 1-2; Ger 6 is equivalent to Ger 3-4. Laboratory fee, \$70 per semester. Prerequisite to Ger 6: Ger 1-2 or 5, or equivalent. (Academic year)

**9-10 German Conversation and Composition (3-3)**

Steiner and Staff

A third-year language course; German as a means of spoken and written communication. German cultural history from its historical roots to the present day.

- Prerequisite: Ger 3-4 or 6, or equivalent. With permission of instructor, Ger 9 or 10 may be taken concurrently with Ger 4. (Academic year)
- 47 **Beginning German for Reading Acquisition (3)** Stal  
For undergraduate and graduate students with little or no German who are interested in acquiring a reading knowledge of German. No academic credit for graduate students. (Summer)
- 49 **German Readings for Nonmajor Students (3)** Stal  
Primarily for graduate students preparing for reading examinations; undergraduates admitted. No academic credit for graduate students. Prerequisite: Ger 4, 10 or 47, or equivalent. (Summer)
- 51-52 **Introduction to German Literature—in English (3-3)** Thoenelt  
Ger 51—The birth of modern individualism, and the 18th-century youth movement leading to the German idyll. Ger 52—German thought and civilization from 1770 to the present. The two faces of contemporary Germany: Goethe and German culture versus German politics. (Academic year)
- 103-4 **Major Themes of German Literature—in English (3-3)** Thoenelt and Stal  
Ger 103—The Faust myth in Western literature. Faust figures in the works of Goethe, Dostoevsky, Stephen Vincent Benét, Paul Valéry, Thomas Mann, Camus. Ger 104—Literature and politics in Germany. Selected readings include Karl Goethe, Schiller, Marx, Heine, Nietzsche, Thomas Mann, Heinrich Mann, Brecht, and Böll. (Alternate academic years)
- 112 **Comparative Studies in Germanic Literatures—in English (3)** Thoenelt and Stal  
Why literature? What is literature? Views and perspectives on the "usefulness" and "uselessness" of literature in modern Western societies. Selected works and excerpts from Plato, Aristotle, Shakespeare, Montaigne, Goethe, Schiller, Nietzsche, Thomas Mann, Camus, Böll, and others. (Spring, alternate years)
- 114 **Four Western Ways of Life—in English (3)** Thoenelt and Stal  
The human condition and four Western ways of life: French moralism, German Bildung, Marxism, and existentialism. Selected readings from Montaigne, Goethe, Schiller, Thomas Mann, Marx, Brecht, Nietzsche, Martin Buber, and Camus. (Fall, alternate years)
- 125 **Utopias and Dystopias in German Letters and Thought—in English (3)** Sachs  
The unfolding German intellectual genius, now at a moral peak, now perverted. Selected readings and excerpts from the works of Lessing, Bonaventura, Heine, Marx, Nietzsche, Hitler, Thomas Mann, and Hermann Hesse. (Fall, alternate years)
- 126 **France and Germany—in English (3)** Sachs  
Comparative study of two European ways of life as reflected and perpetuated in literature and philosophy. Relevant excerpts and documents from the 16th to the 20th century. (Spring, alternate years)
- 131-32 **18th-Century German Life and Letters—in German (3-3)** Thoenelt  
Germany as the country of poets and thinkers. Readings in literature, education, philosophy, religion, and politics by Wolfram von Eschenbach, Luther, Lessing, Kant, Goethe, Schiller, Schleiermacher, Wilhelm von Humboldt, Thomas Mann, and Rudolf Steiner. (Alternate academic years)
- 141-42 **19th-Century German Literature—in German (3-3)** Stein  
Romanticism, Biedermeier, Young Germany, Poetic Realism. Second age of Christianity and Sehnsucht, revolution and counterrevolution in thought and literature. Development of modern nationalism and cosmopolitanism as reflected in the literature of the period. Reading, lecture, and discussion. (Alternate academic years)
- 151-52 **20th-Century German Literature—in German (3-3)** Stein  
The age of Nietzsche, Naturalism, Impressionism, Expressionism; Kafka, Thomas Mann, Hermann Hesse; émigré literature, contemporary drama; authors of Gruppe 47. Reading, lecture, and discussion. (Alternate academic years)
- 161-62 **Studies in Germanic Languages and Literatures—in English (3-3)** Sachs  
Topics for 1991-92: Germanic mythology—characters, tales, and motifs. Runes as a cultic device. Introduction to the pre-Christian religion of the Germanic peoples and to an interdisciplinary study of mythology. (Academic year)



- 179-80 **Advanced German Conversation and Composition (3-3)** Thoenelt  
A fourth-year language course designed to achieve near-native fluency in speaking and writing German. Discussions and compositions on literary and cultural topics, reading of the German weekly newspaper *Die Zeit*, interpretations of selected texts (Gottfried Benn and Thomas Mann), grammatical and stylistic studies. Prerequisite: Ger 9-10 or equivalent. (Alternate academic years)
- 183 **Individualism, Reason, and Tradition in Early Modern Europe (3)** Kennedy  
Same as Engl/Fren/Hist/Rel 183 and Art 187.

## GREEK

See Classics.

## HEBREW

See Classics.

## HISTORY

Professors H.M. Sachar, R.W. Kenny, P.P. Hill, L.G. DePauw, R. Thornton, L.G. Schwoerer, P.F. Klarón, R.E. Kennedy, Jr., W.H. Becker (Chair), L.P. Ribuffo, E. Berkowitz, R. Spector  
 Professorial Lecturers S. Shaloff, B.F. Cooling  
 Associate Professors C.J. Herber, W.R. Johnson, R.A. Hadley, A.D. Andrews, J.O. Horton, M.A. Atkin, S. Strasser  
 Adjunct Associate Professor K. Bowling  
 Associate Professorial Lecturer R.M. Hathaway  
 Assistant Professors H.L. Agnew, R.B. Stott, G. Savage (Visiting)  
 Director and Principal Investigator of the First Federal Congress Project C. Bickford

Bachelor of Arts with a major in history—The following requirements must be fulfilled:

1. Majors must meet the general requirements of Columbian College, selecting specific courses in consultation with either a departmental or college advisor. For the foreign language or culture requirement, majors must meet the foreign language, rather than foreign culture, requirement.

2. Majors must either take or waive the introductory courses Hist 39-40 and 71-72. Waiver may be accomplished by passing a departmental examination, which is held a few days before the beginning of classes. Credit as well as waiver may be obtained also by departmental examination, or by scoring above 600 on College Board Achievement Tests, or by scoring 4 or 5 on Advanced Placement Examinations. Neither waiver nor credit is awarded by CLEP subject examination.

3. Distributed courses within the major must include (for a total of 27 credit hours):

(a) Hist 199 (proseminar);  
 (b) two seminars, one of which must be a research seminar (see the Graduate Programs Bulletin);

(c) two 100-level courses in each of the following three fields:

(1) Europe—Hist 101, 105, 106, 109, 110, 111, 112, 121, 122, 123, 124, 125, 127, 131, 132, 136, 139, 140, 141, 142, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 183

(2) United States—Hist 117, 118, 128, 129, 133, 134, 137, 138, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 184, 185, 186, 197

(3) Russia, Asia, Africa, and Latin America—Hist 107, 108, 116, 119, 120, 135, 145, 146, 158, 161, 162, 163, 164, 165, 166, 187, 188, 189, 193, 194, 195, 196

Special topics courses numbered 198 and courses in the 700 Series may also satisfy one of the three field requirements. Majors should check with the major advisor on the applicability of such courses.

For Special Honors in history, a history major must meet the general honors requirements listed under Regulations. In addition, the Department requires candidates to apply for the special honors program before the end of the first semester of the junior year. During the second semester of the junior year, candidates for the program must receive a grade of A in a 3-hour research seminar, preferably taken with the professor who will advise the senior thesis. Candidates admitted to the program will subsequently enroll in the research seminar, Hist 191, and complete a senior honors thesis in Hist 192 during their last semester. Only if the thesis merits the grade of A will Special Honors be recommended.

**Minor in history**—Undergraduate students who select a minor in history must ordinarily declare their intention to the departmental advisor no later than the beginning of their senior year. Such students may choose a nonspecialized history curriculum, or may concentrate in one area, such as ancient history, medieval history, early modern Europe, modern Europe, the Near East, Russia and East Europe, the United States, Latin America, or the Far East, or in one field, such as economic, social, intellectual, diplomatic, political, black, or women's history. In each case the program of courses will be planned in consultation with the history advisor. To meet the departmental requirements for a minor, the student must complete Hist 39–40 or 71–72 and at least five additional approved history courses with a grade of C– or above. One seminar must be included in the program.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Waiver Examinations:** Waiver examinations are given three times per year, a few days before the beginning of classes in the fall and spring semesters and the first summer session.

**Course Accessibility:** All 100-level courses are open to students without history course prerequisites with the exception of Hist 135, 157, and 199.

**39–40 European Civilization in Its World Context (3–3)**

Staff

Hist 39: Introduction to the political, social, economic, religious, and cultural history of Europe from about 800 A.D. to 1715. Hist 40: From 1715 to the present. (Academic year)

**50 Washington, D.C.: History, Culture, and Politics (3)**

Gillett

Same as AmCv/PSc/UPRE 50.

**71–72 Introduction to American History (3–3)**

Staff

Hist 71: political, social, economic, and cultural forces of the United States, in world perspective, from the earliest settlements to 1876. Hist 72: from 1876 to present. (Academic year)

**101 The European Revolutionary Tradition, 1640–1917 (3)**

Kennedy

A comparative study of the English, French, and Russian revolutions with focus on theories of revolution, revolutionary ideology, millenarianism, and the revolutionary legacy inherited by third-world movements. (Fall)

**105–6 History and Philosophy of Natural Science (3–3)**

Schlager

A history of the natural sciences and their implied cosmologies. Emphasis on empirical discoveries and modes of explanation, changing conceptual frameworks and methodologies, and philosophical implications. Hist 105: Early natural philosophy to the rise of modern science. Hist 106: Developments in the physical and biological sciences from the 19th century to the present.

**107 The Ancient Near East and Egypt to 322 B.C. (3)**

Hadley

Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to Alexander's conquest.

**108 Greece and the Near East, 359 B.C. to the Second Century A.D. (3)**

Hadley

Survey of cultural, social, political, and economic developments in the Hellenistic world and societies of the Near East from the reign of Philip II to the height of Roman power and influence in these regions.

**109 Early Aegean and Greek Civilizations to 338 B.C. (3)**

Hadley

Neolithic background; Bronze Age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the Macedonian conquest. (Fall)

**110 The Roman World to 337 A.D. (3)**

Hadley

Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. (Spring)

**111–12 Medieval History (3–3)**

Andrews

Hist 111: Failure of the old Roman Empire, formation of barbarian kingdoms in the West and their evolution to about 1000 A.D.; Byzantium and Islam at their apogee. Hist 112: Medieval European daily life, institutions, and creative movements to about 1400; the Crusades and the Near East to the rise of the Ottoman Turks. (Academic year)



- 116 History of Africa (3)** Shaloff  
Survey of political, cultural, and economic development from ancient times to the present, with emphasis on the rise and demise of European colonialism. (Spring)
- 117 Crisis or Conspiracy? A History of the International Politics of Oil (3)** Becker  
The history of the international politics of oil, with special attention to developing relationships between major oil companies and governments here and abroad. (Summer)
- 119 China in the 20th Century: Reform and Revolution (3)** Johnson  
Origins, goals, substance, and significance of political, social, and intellectual upheavals in China from 1900 to the present. (Summer)
- 121 The Renaissance in Western Europe (3)** Schwoerer  
Study of the economic, political, intellectual, and cultural acceleration in Western Europe, beginning in the Italian city-states and spreading to France, Germany, and England, in the 14th through 16th centuries. (Fall)
- 122 The Reformation in Western Europe (3)** Herber  
Religious, political, and social consequences of the theological upheavals of the 16th century. (Spring)
- 123 European Intellectual History I (3)** Kennedy  
Popular culture; religion and science in the 17th century; the Enlightenment; Voltaire, Hume, Rousseau, Montesquieu, Beccaria, Diderot, Condorcet on religion, history, nature, society, and politics; the intellectual origins of the French Revolution. (Fall, even years)
- 124 European Intellectual History II (3)** Kennedy  
Intellectual responses to the French Revolution; 19th-century historical approaches to society, religion, economics, biology, ethics, and psychoanalysis; Hegel, Comte, Marx, Darwin, Nietzsche, and Freud; the intellectual origins of Nazism; literary, artistic, and philosophical responses to World War I. (Spring, odd years)
- 125 Women in European History (3)** Schwoerer  
A study of the role of women in the political, social, intellectual, and economic life of Europe from the Middle Ages to the 20th century. (Spring)
- 128-29 War and Society (3-3)** Allard  
How wars, armed forces, and defense policies have affected British and American politics and society. Special attention to the relationship of defense and foreign policy, civil-military relations, the development of strategic thought, and the naval and military influence Britain and America have exerted on each other. Hist 128: 1776-1918. Hist 129: 1919-present. (Academic year)
- 131-32 History of Germany (3-3)** Herber  
Political, social, and cultural development. Hist 131: From mid-17th century to Bismarck. Hist 132: From William II to the present. (Academic year)
- 133 Recent U.S. History, 1890-1941 (3)** Ribuffo  
Political, social, diplomatic, and intellectual developments, with particular emphasis on the "searching" '20s and New Deal. (Fall)
- 134 Contemporary U.S. History Since 1941 (3)** Ribuffo  
Political, social, diplomatic, and intellectual developments, with particular emphasis on the Cold War, "silent" '50s, and disrupted '60s. (Spring)
- 135 History of Soviet Intelligence Services (3)** Dziak  
The role and impact of intelligence and security operations in Soviet domestic and foreign policy, from 1917 to the present. Tsarist antecedents; Lenin, the Cheka, and the formative years; operations under Stalin; problems of the post-Stalin years; and operations in the Brezhnev era. Prerequisite: Hist 146 or PSc 131 or 168, or permission of instructor.
- 136 Europe in the 20th Century (3)** Sachar  
Diplomatic, political, and cultural developments from the turn of the century to the present. (Spring)
- 137 U.S.-Soviet Strategic Relations Since World War II (3)** Thornton  
Survey of U.S.-Soviet global rivalry from World War II to the present; comparative historical assessment of the changing strategic balance. (Spring)
- 138 American Foreign Economic Policy in Historical Perspective (3)** Becker  
Historical evolution of United States international economic relations, major issues of foreign economic policy, political problems in policy-making. Emphasis on period since 1945. (Spring)

- 139-40 World History in the 20th Century (3-3)** Sachar  
Diplomatic, political, and cultural factors. Hist 139: From the turn of the century to the Munich settlement of 1938. Hist 140: From the Munich settlement to the present. (Academic year)
- 141 History of France I (3)** Kennedy  
Old Regime: Louis XIV, demography, peasants, bourgeois, nobles; Church-Protestant-Jewish relations; salons, Enlightenment, and philosophes; literacy and education; Robespierre and Revolution; Napoleon. (Fall, odd years)
- 142 History of France II (3)** Kennedy  
The Revolutionary tradition and authoritarianism from the Restoration to Du Gaulle; the events of 1848, socialism and the class struggle; women, marriage, morals, and population; industrialization and rural France; deChristianization, Catholic integralism, and worker priests; France's decline as a world power; its intellectual and artistic leadership. (Spring, even years)
- 145 Russia to 1801 (3)** Atkin  
Survey of Russian history from the rise of the Kievan confederation in the ninth century to the establishment of Imperial Russia as a European great power. Attention will be given to the political, socioeconomic, and cultural history of the East Slavs, especially the Russians. (Fall)
- 146 Russia Since 1801 (3)** Atkin  
Survey of Russian and Soviet history from the reign of Alexander I to the post-Stalin era. Attention will be given to the contending forces of revolution, reform, and conservatism; diplomatic relations; economic development; and social change. (Spring)
- 147 The French Revolution (3)** Kennedy  
Social, political, economic, and cultural history of the decade of revolution, 1789-1799. Attention to its structural consequences in France and in Europe at large. (Summer)
- 149-50 European Diplomatic History (3-3)** Stahl  
Emphasis on policies and actions of the great powers and their statesmen. Issues of war and peace, international crises, nationalism, alliances, and tensions. Hist 149: 1812 to 1890. Hist 150: Since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157. (Academic year)
- 151-52 History of England (3-3)** Kenn  
Development of English civilization and its impact on Western culture. Hist 151: To 1689. Hist 152: Since 1689. (Academic year)
- 153 Tudor England (3)** Kenn  
Aspects of the constitutional, social, intellectual, economic, and religious development of England, 1485-1603. (Fall)
- 154 Stuart England (3)** Schwoerer  
The civil wars, Restoration, and Glorious Revolution. Political, religious, social, economic, and intellectual developments in England, 1603-1714. (Spring)
- 155 History of Modern Ireland (3)** Kenn  
The political and cultural development of Ireland since the Middle Ages and the continuing interaction between Ireland and England, with emphasis on the period from the Act of Union of 1801 to the Partition of 1923.
- 156 Jewish History from 70 A.D. to 1648 (3)** Stahl  
A history of the Jewish people from the destruction of the Temple through the rabbinic and medieval period, with emphasis on contacts with Christian and Muslim communities and cultures. (Fall)
- 157 20th-Century European Diplomatic History (3)** Sachar  
The main currents, with necessary 19th-century background. Students who receive credit for Hist 157 cannot receive credit for Hist 150. (Fall)
- 158 Modern Jewish History (3)** Sachar  
A secular history of the Jewish people from the 18th century to the present state of Israel; emphasis on European political, economic, and cultural influences. (Spring)
- 161 Revolution in 20th-Century Latin America (3)** Klarén  
Examination of the major social revolutions in modern Latin America, especially in Mexico, Bolivia, Cuba, and Nicaragua; their origins, ideology, process, and outcomes. (Fall)



- 162 20th-Century Latin America (3)** Klarén  
A survey of the main societal trends shaping Latin America in this century, with particular emphasis on such themes as populism, urbanization, reformism, modernization, nationalism, revolution, the military dictatorship, and the development process. (Spring)
- 163-64 History of Latin America (3-3)** Klarén  
Hist 163: Analysis of Spanish and Portuguese imperialism in the New World, 1492-1820. Hist 164: A problems approach to Latin America, 1820 to the present; thematic emphasis on neocolonialism, corporatism, liberalism, caudillismo, modernization, populism, and revolution. (Academic year)
- 165 Latin America and the Industrializing World, 1850-present (3)** Klarén  
Examination of the political diplomatic responses of Latin American nations, individually and collectively, to the expanding industrial powers of the Northern hemisphere in the 19th and 20th centuries, particularly to the United States. (Fall)
- 167 Themes in U.S. Cultural History (3)** Mondale, Gillette  
Same as AmCv 167.
- 169 The American Revolution (3)** DePauw  
The political, intellectual, social, military, and economic impact of the events surrounding the separation of the United States from the British Empire. Special attention to the influence of non-elite groups. (Fall)
- 170 U.S. Early National History (3)** Hill  
Political, diplomatic, economic, and social history of the early republic, 1787-1828. (Fall)
- 171-72 U.S. Social History (3-3)** Horton  
Hist 171: Daily life, institutions, intellectual and artistic achievements of the agrarian era, 1607-1861. Hist 172: The urban-industrial era from 1861 to present. Same as AmCv 171-72. (Academic year)
- 173 Afro-American History (3)** Horton  
Survey of the Afro-American experience, emphasizing the contributions of black Americans to and their impact upon American history. (Fall)
- 174 Special Topics in Afro-American History (3)** Horton  
Concentration on specific issues central to the Afro-American experience. Consult *Schedule of Classes* for issues to be addressed. (Spring)
- 177 The Jacksonian Era and the Rise of Mass Politics (3)** Horton  
The period 1828-1860 and its continuing significance to American society; emphasis on racial and gender divisions and changes in the legal and political systems. (Fall, alternate years)
- 178 Making and Braking the Welfare State (3)** Berkowitz  
An examination of America's changing approaches to health and welfare problems, explaining the origins of modern entitlement programs and examining ways in which these programs have been adapted and reshaped. Topics such as welfare reform and health insurance are covered. (Spring)
- 179 U.S. Economic History (3)** Berkowitz  
Survey of American economic history from colonial times to the present. Particular attention is given to the economics of slavery, the development of a national industrial economy, and the growth of the federal government as an influence on economic policy. Same as Econ 179. (Fall)
- 181-82 U.S. Diplomatic History (3-3)** Hill  
American foreign relations from the era of the American Revolution. Hist 181: to 1898. Hist 182: 20th century. (Academic year)
- 183 Individualism, Reason, and Tradition in Early Modern Europe (3)** Kennedy  
An interdisciplinary examination of the rise of Western individualism from the Renaissance to the American and French Revolutions. Analysis of the tension between reason and religious and popular traditions. Core course for Early Modern European Studies majors; open to others. Same as Engl/Fren/Ger/Rel 183 and Art 187. (Spring, alternate years)
- 184 Civil War and Reconstruction (3)** DePauw  
How tensions between the sections developed into violence, how a total war was fought on American soil, and how the experience of war affected the generation that lived through it. (Spring, alternate years)

- 185 History of Women in America (3)** DePaul  
Survey of the political, economic, social, military, religious, intellectual, and cultural practices in North America from 1000 A.D. to the present as these have affected and been affected by the female half of the population. Same as AmCv 185. (Spring, alternate years)
- 186 U.S. Urban History (3)** Gillette, Staff  
The American city from colonial foundations to the present, relating social and economic forces to physical form. Special emphasis on transitions from pre-industrial to industrial to metropolitan forms, focusing on implications for public policy and historic preservation. Same as AmCv 186. (Fall)
- 187 History of Modern China (3)** Johnson  
China since 1840, with particular attention to political developments. (Fall)
- 188 History of Chinese Communism (3)** Thornton  
Survey of the leadership, ideology, structure, and foreign and domestic policies of the Chinese Communist Party from its inception to the present. (Fall)
- 189 History of Modern Japan (3)** Staff  
Japan's century of modernization—from the Meiji Restoration of 1868 to the present. Emphasis on historical, political, economic, and cultural factors. (Fall)
- 190 Ethnohistory (3)** Wagner, Humphrey  
Same as Anth 190.
- 191-92 Senior Honors Thesis (3-3)** Atkins  
Required of and open only to undergraduate honors candidates in history. (Academic year)
- 193 History of the Near East (3)** Staff  
Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. (Fall)
- 194 History of the Modern Near East (3)** Staff  
Beginning with Napoleon's invasion of Egypt. Development of nationalism and of modern states; impact of the West on culture and institutions; great-power imperialism; crises of Turkish Straits, Suez, Arab-Israeli relations; and other issues. (Spring)
- 195 Traditional Civilizations of China and Japan (3)** Johnson  
Intellectual, institutional, and social development of the traditional civilizations of China and Japan, from their origins to 1800. (Fall)
- 196 The Modern Transformation of China and Japan (3)** Johnson  
The social, political, and intellectual transformation of China and Japan from the mid-19th century to the present. (Spring)
- 197 Oral History and Interview Techniques (3)** Staff  
Same as AmCv/Anth 197.
- 198 Special Topics in History (3)** Staff  
Historical perspectives on great issues of past and present. New topic each semester.
- 199 Proseminar: Readings for the History Major (3)** Staff  
Required of history majors; this course should be taken during the junior year. Readings and discussions on major trends in history; representative selections from the classics of historical literature. Students who receive credit for Hist 199 cannot receive credit for Hist 201. (Fall and spring)

## HONORS

### University Honors Program Committee

S. Strasser (Director), H. Agnew, A. Altman, M.D.M. Brewer, N.C. Garner, L. Graff, D.R. Grier, M. Klock, W.C. Parke, H. Weingartner, J.E. Ziolkowski

Courses listed under Honors are open only to undergraduate students who have been admitted to the University Honors Program. Applications are sent to qualifying students when they apply to the University; freshmen who are interested in the program may have an opportunity to apply to join as sophomores. In 1991-92, the program will include students from Columbian College of Arts and Sciences, the Elliott School of International Affairs, and the School of Business and Public Management.



**23-24 Mathematical Theory of Languages (3-3)**

Staff

Language, information, meaning, truth, and paradox. Formal (artificial) versus natural languages. Chomsky's classification of languages and their recognition by conceptual machines. Mathematically formalizing fragments of natural language. Situation semantics, a recent complete theory of linguistic meaning.

**33-34 Honors General Chemistry (4-4)**

Equivalent to Chem 11-12, but with selected topics studied in greater depth. Additional topics covered may include environmental chemistry, biochemistry, or industrial chemistry. Laboratory fee, \$40 per semester. (Credit will be allowed for only one of the following sets of courses: Honr 33, Chem 11, Chem 17; Honr 34, Chem 12, Chem 18.)

**43-44 Honors Introductory Economics (3-3)**

Staff

Honr 43: Introductory microeconomics, including market supply and demand, how price systems function, and philosophical issues. Honr 44: Introductory macroeconomics, including determination of national output, income, prices, and employment. Problems of forecasting and controlling economics variables. (Credit will not be given for both Honr 43 and Econ 11 or Honr 44 and Econ 12.)

**63-64 Honors English (3-3)**

Staff

Major documents of British literature, contextualized in their own culture and in relation to other discourses. Questions of canon, authority, and historicity. Contemporary theoretical issues. Authors include Chaucer, Shakespeare, Milton, Wordsworth, Joyce. (Credit will not be given for both Honr 63 and Engl 51 or Honr 64 and Engl 52.)

**71-72 Honors Western Society and Civilization (3-3)**

Staff

Central texts and major ideas of Western civilization. Honr 71 examines the Greek, Roman, Judaic, and Christian traditions through readings in classical epic, drama, history, scripture, philosophy, spiritual autobiography. Honr 72 examines key works from the Middle Ages, Renaissance, and Enlightenment. (Credit will not be given for both Honr 71 and Hmn 1 or Honr 72 and Hmn 2.)

**HUMAN KINETICS AND LEISURE STUDIES**

Professors J.E. Snodgrass, D.C. Paup (Chair)

Adjunct Associate Professor D. Frechtling

Assistant Professors H. Nashman, P.A. Sullivan

Instructors E.C. Rach, S.E. Spivack

Adjunct Instructors B.J. Westerman, R.L. Jarvis, R.L. Harrison, K. Vecchione, C.W. Warner, M.J. Warner, J. Lee

See the School of Education and Human Development for programs of study leading to the degrees of Bachelor of Science in Human Kinetics and Leisure Studies (with specialization in exercise and sport science).

The University is not responsible for injuries received in any of the activities of the Department of Human Kinetics and Leisure Studies, and the student assumes full responsibility therefor.

**EXERCISE AND SPORT ACTIVITIES**

With the exception of students pursuing undergraduate degrees in the School of Education and Human Development, credit for exercise and sport activities courses is not recognized for the baccalaureate. Some exercise and sport activities courses may be repeated for credit by those students who are eligible to receive credit for such courses.

10 Beginning Badminton (1)

20 Beginning/Intermediate Golf (1)

21 Foil Fencing (1)

22 Basketball (1)

24 Volleyball (1)

26 Karate (1)

27 Tennis (1)

29 Yoga (1)

30 Fitness (1)

32 Beginning Swimming (1)

33 Swimming (1)

Breen

Staff

Staff

Staff

Staff

Staff

Staff

Staff

Staff

Staff

- 34 **Intermediate Swimming** (1) Staff  
 37 **Soccer** (1) Staff  
 38 **Racquetball** (1) Staff  
 42 **Aerobics** (1) Staff  
 43 **Tai Chi** (1) Staff  
 45 **Experimental Activities** (1) Staff  
 Topic and amount of laboratory fee (if charged) announced in *Schedule of Classes*. May be repeated for credit.  
 50 **CPR and First Aid** (2) Staff  
 Training for certification in cardiopulmonary resuscitation and first aid. Laboratory fee, amount announced in *Schedule of Classes*.  
 54 **Intermediate/Advanced Tennis** (1 or 2) Staff  
 Development of skills, theories of strategy; emphasis on competitive play as a lifetime sport.  
 55 **Water Safety Instructor Certification** (2) Staff  
 56 **Scuba Diving** (2) Staff  
 Laboratory fee, amount announced in *Schedule of Classes*.  
 59 **Team Sports** (2) Staff  
 60 **Racket Sports** (2) Staff  
 61 **Lifeguard/Lifeguard Instructor** (2) Staff  
 62 **Conditioning/Weight Training** (2) Staff  
 65 **Skiing** (2) Staff  
 Laboratory fee, amount announced in *Schedule of Classes*. (Spring)  
 66 **Sport Clinics and Workshops** (1 to 3) Staff  
 Special intensive study and skill development. There may be a laboratory fee; amount announced in *Schedule of Classes*.

## HUMAN KINETICS

- 101 **Experimental Course** (3) Staff  
 Topic to be announced in *Schedule of Classes*.  
 103 **Professional Foundations of Human Kinetics and Leisure Studies** (3) Snodgrass  
 Nature, scope, and scientific basis of human kinetics and leisure studies; orientation to professional competencies.  
 107 **Personal Health and Wellness** (3) Sullivan  
 A survey of the various components involved in personal health and wellness such as personal fitness, sexuality, mental health, and environmental health. Emphasis is on application of knowledge through the use of decision making and behavior modification skills.  
 109 **Fitness Programs: Testing and Prescription** (3) Paul  
 Evaluation of aerobic capacity, muscular strength, flexibility, and ideal body weight; development of prescribed exercise programs. (Fall)  
 110 **Fitness Programs: Supervision and Leadership** (3) Sullivan  
 Concepts and techniques of the supervision and management of fitness programs. (Spring)  
 111 **Sports Education Technique and Analysis: Racket Sports** (3) Paul  
 Basic concepts in skill development, analysis, and evaluation in the racket sports: badminton, racketball, squash, and tennis. (Fall)  
 112 **Sports Education Technique and Analysis: Team Sports or Aquatics** (3) Sullivan  
 Techniques of teaching, coaching, and management of team sports or aquatics. (Spring)  
 122 **Methods and Materials for Health Education** (3) Staff  
 Conceptual approach to curriculum design and teaching, including planning and organization, methodology, selection and use of materials, and evaluation of basic health knowledge. (Spring)  
 129 **Introduction to Motor Learning** (3) Staff  
 Concepts of skill learning applied to teaching, coaching, and performing motor skills. (Fall)  
 130 **Introduction to Motor Development and Life-Span Fitness** (3) Snodgrass  
 Study of the evolution and refinement of fundamental movement skills throughout the life span. (Fall)



- 134 Sports and Nutrition (3)** Staff  
The nutrition needs for recreational exercise and sports; skills in assessing nutrition needs; development of individual nutrition programs that are sport/activity-specific; and identification and correction of nutrition problems affecting sports performance. (Fall)
- 138 Organization and Management of Sport and Exercise Programs (3)** Staff  
Introduction to concepts of management related to sport and exercise program.
- 139 Principles of Coaching (3)** Sullivan  
Study of coach-athlete behavioral patterns and interactions, coaching methods, and interdisciplinary principles applicable to coaching. (Spring)
- 140 Exercise and Sport Psychology (3)** Sullivan  
Study of psychological aspects of sport participants, athletes, teams, and competition in sport situations, including personality, motivation, performance level, achievement, and behavioral change strategies; social factors, training events, and measurement techniques. (Fall)
- 145 Working, Stress, and Human Values (3)** Nashman  
Recognition, prevention, and control of stress and the burnout syndrome. A humanistic inquiry into values, attitudes, and stressors associated with various professions. Admission by permission of instructor. (Fall)
- 146 Stress Management, Burnout, and Human Potential (3)** Nashman  
The nature, prevention, and control of the stress and burnout syndrome. Students will design an overall stress management strategy that incorporates achievement of life goals and human potential in a stress-efficient manner. Admission by permission of instructor. (Spring)
- 150 Introduction to Human Anatomy (3)** Staff  
Systematic study of the structure of the human body, with emphasis on joints, muscles, and neuromuscular mechanisms. (Fall)
- 151 Kinesiology (3)** Paup  
Analysis of human movement with emphasis on the biomechanics of exercise and sport movement patterns. Prerequisite: an approved course in anatomy. (Spring)
- 152 Physiology of Exercise (3)** Paup  
The physiological functions of the body and the effect of exercise on these functions. Prerequisite: HmKn 150 or permission of instructor. (Fall)
- 158 Safety: Prevention and Care of Sports Injuries (3)** Westerman  
Safety education, liability, prevention and care of sports injuries; related personnel, facilities, and equipment.
- 159 Athletic Training and Rehabilitation (3)** Westerman  
The course is designed to provide lectures and lab sessions dealing with upper and lower extremities for injury evaluation techniques, the use of therapeutic modalities, and rehabilitation techniques. Prerequisite: HmKn 158. (Spring)
- 161-62 Practicum (3-3)** Paup, Nashman  
For departmental majors and minors only. Practical experience in related disciplines. May be repeated for credit. (Academic year)
- 171 Senior Seminar (3)** Snodgrass  
Study of current literature with implications for human kinetics specializations; use of library resources and retrieval systems; evaluation of professional competencies. Prerequisite: HmKn 103 or permission of instructor. (Spring)
- 172 International Experiences (1 to 6)** Staff  
For departmental majors only. Travel to a foreign country for study of a specific topic.
- 173 Independent Study (1 to 3)** Staff  
For departmental majors only. Individually designed model for intensive study in an area of special interest. Prerequisite: demonstrated competency for independent work and permission of advisor and instructor. May be repeated for credit.
- 175 Field Experiences/Internship (3 to 9)** Paup, Nashman  
For departmental majors only. Prerequisite: HmKn 161-62 or equivalent. Admission by permission of advisor. (Fall, spring, and summer)
- 184 Workshop (1 to 3)** Staff  
Topic to be announced in *Schedule of Classes*. May be repeated for credit with permission of advisor.

## TRAVEL AND TOURISM

- 101 **Experimental Course (3)** Staff  
Topics announced in the *Schedule of Classes*.
- 104 **Introduction to Travel and Tourism (3)** Spivack  
Survey of the travel and tourism industry with emphasis on marketing tourism and travel, research and development of tourist destinations, and the economic and social impact of tourism. (Fall, spring, and summer)
- 113-14 **Practicum (3-3)** Hawkins, Rach  
For departmental majors only. Practical experience in travel and tourism related disciplines. (Academic year and summer)
- 143 **Tourist Accommodations and the Hospitality Industry (3)** Rach  
An overview of the basic principles involved in the management, operations, marketing, and financing of hotels, restaurants, and other tourist accommodations, facilities, and services. (Spring)
- 144 **Tourist Attractions and Activities (3)** Spivack  
Basic principles of planning, developing, and managing natural and man-made attractions. National, state, and local park systems, as well as private sector resorts, theme parks, and other tourist attractions are examined. Various recreation activities popular among tourists are examined in view of their personal, economic, social, and environmental impacts. (Spring)
- 145 **Travel and Tourism Advertising, Public Relations, and Sales Techniques (3)** Staff  
Reviews and applies basic advertising, public relations, and sales techniques to the travel and tourism field. Includes study of effective techniques and selected case studies and current practices. (Spring)
- 146 **Tourist Characteristics and Behavior (3)** Rach  
Socioeconomic, demographic, and psychological characteristics of various types of tourist populations. Emphasis on tourist behavior in planning, developing, and marketing tourism programs and services. Cultural differences as they influence travel. (Fall)
- 147 **Travel and Tourism Transportation Systems (3)** Staff  
Overview of the various transportation modes. Planning, financial, operational, marketing, and evaluation aspects of the different systems of transportation. Limited emphasis on the development of travel distribution systems to support specific transportation modes. (Fall)
- 172 **International Experiences (1 to 12)** Staff  
For departmental majors only. Travel to a foreign country for study of a specific topic. (Fall, spring, and summer)
- 173 **Independent Study (1 to 6)** Staff  
For departmental majors only. Individually designed model for intensive study in an area of special interest. Prerequisite: demonstrated competency for independent work and permission of advisor and instructor. May be repeated for credit. (Fall, spring, and summer)
- 178 **Designing and Implementing Conferences and Meetings (3)** Rach  
Same as HRD 178. (Spring and summer)
- 184 **Workshop (1 to 6)** Staff  
Topics announced in the *Schedule of Classes*. May be repeated for credit with permission of advisor. (Fall, spring, and summer)
- 193 **Domestic and International Tourism Destinations (3)** Staff  
Physical and cultural geography of major tourist destinations. Guest-host relationships; information systems. (Spring)

## HUMAN RESOURCE DEVELOPMENT

See Human Services.



## HUMAN SERVICES

Professors L. Winkler, E.W. Kelly, Jr., J.C. Heddesheimer, D.W. Dew (Research), C.H. Hoare (Chair)  
 Adjunct Associate Professor B.B. Cuje  
 Instructor T. Martin  
 Lecturer S.A. Straw

See the School of Education and Human Development for programs of study leading to the degree of Bachelor of Arts in Education and Human Development.

## COUNSELING

- 133 **Supervised Experience in Counseling** (3 to 6) Staff  
 Fieldwork, internship, and instructional practice. Admission by permission of instructor. (Fall and spring)
- 162 **Foundations of Counseling** (3) Heddesheimer, Kelly, Winkler  
 Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall, spring, and summer)
- 163 **Personal and Social Adjustment** (3) Winkler  
 Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Spring)
- 193-94 **Research and Independent Study** (arr.) Hoare and Staff  
 Individual research under guidance of a staff member. (Academic year)
- 200 **Special Workshop in Counseling** (arr.)  
 Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

## HUMAN RESOURCE DEVELOPMENT

- 133 **Supervised Experience in Human Resource Development** (3 to 6) Staff  
 Fieldwork, internship, and instructional practice. Admission by permission of instructor. (Fall and spring)
- 178 **Designing and Implementing Conferences and Meetings** (3) Staff  
 Same as T&T 178. Use of design committees, steering committees, selection of resource people, site selection, exhibits, and relation to supplier personnel. Special attention to designing the core of the conference and related conference activities. (Spring and summer)
- 180 **Facilitating Adult Learning** (3) Staff  
 Emphasis on developing and/or improving skills in formal instruction, using a wide variety of instructional strategies in adult learning situations. (Summer)
- 193-94 **Research and Independent Study** (arr.) Staff  
 Individual research under guidance of a staff member. (Academic year)
- 200 **Special Workshop in Human Resource Development** (arr.) Staff  
 Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

## HUMAN SERVICES

- 75 **Introduction to Rehabilitation** (3) Linkowski  
 Overview of rehabilitation profession, including philosophy, history, ethics, legislation, settings, and practice. (Fall)
- 133 **Supervised Experience in Human Services** (3 to 6) Hoare  
 Fieldwork, internship, and instructional practice. Admission by permission of instructor. (Fall and spring)
- 176 **Program Planning and Development for Service Agencies** (3) Ferrante, Hoare  
 Examination of program planning and development activities essential to human service agencies. Through case studies and on-site field experiences, students examine and analyze a variety of processes in which agency needs are assessed and programs planned. (Spring)
- 178 **Psychosocial Aspects of Disabilities** (3) Linkowski  
 Impact of disabilities and concepts of normalization. (Fall)

- 181 **Medical Aspects of Disabilities (3)** Linkowski  
Chronic and traumatic disorders with rehabilitation implications. (Fall)
- 182 **Organization and Administration in the Human Services (3)** Hoare and Staff  
Introduction to organizational theory and program administration in non-school agencies, staff recruitment and development, fiscal operations, personnel and program supervision, facilities, and maintenance of effective community relations. (Spring)
- 193-94 **Research and Independent Study (arr.)** Hoare and Staff  
Individual research under guidance of a staff member. (Academic year)
- 195 **Seminar in Human Services: Current Issues (3)** Hoare  
Analysis of selected issues in human services. Each student conducts an investigation of an identified problem in human services and completes a skill assessment project. Admission by permission of instructor. (Spring)
- 200 **Special Workshop in Human Services (arr.)** Hoare  
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

## HUMANITIES

### Humanities Steering Committee

J.A.A. Plotz (Coordinator), A. Altman, J. Anderson, G. Carter, J. Chaves, R.P. Churchill, E.A. Fisher, J. Frey, R.E. Kennedy, C. Sponsler, M. Ticktin, D.D. Wallace

Columbian College of Arts and Sciences offers a set of interdisciplinary courses designed to provide a coherent introduction to classic works in the humanities. The courses deal with historical figures, creative works of art and literature, systems of philosophy, and religious traditions that are the common property of educated people. The full interpretation of these fundamental sources of Western culture requires the collaboration of faculty from all disciplines of study encompassed in the humanities.

- 1 **Roots of the Western Tradition (3)** Staff  
Basic ideas of Western thought from early Greek, Roman, Judaic, and Christian traditions. Representative readings in drama, epic, historical writings, oratory, creation stories, scriptural traditions, philosophy, and spiritual autobiography. Some sections are taken in conjunction with Engl 13. (Fall and spring)
- 2 **Ideas in Western Culture: Aquinas to Locke (3)** Staff  
An examination in historical context of central texts from the Middle Ages, the Renaissance, and the Enlightenment: Aquinas, Dante, Machiavelli, Erasmus, Luther, Montaigne, Bacon, Shakespeare, Rabelais, Descartes, Milton, and Locke. (Fall and spring)
- 4 **Romanticism and Revolution: The 19th Century (3)** Frey  
Major themes of 19th-century culture from 1789 to 1900 in representative works of European and American art, literature, music, drama, philosophy, and theology. The 19th-century resources of Washington—museums, monuments, collections, concerts, plays—form part of the curriculum.
- 5 **The 20th-Century Consciousness (3)** Green  
Major themes and paradigms of 20th-century civilization as expressed in key literary and philosophic texts, visual arts, music, and cultural artifacts. Key issues include the meaning of history in the age of two world wars; the Holocaust and the crisis of reason; the authority of science; the decline of Western hegemony; modernism and postmodernism. (Spring)
- 6 **Asian Humanities (3)** Chaves, Hildebeitel, Kim-Renaud, Srinivasan  
The traditional art and literature of the cultures of South Asia (India, Pakistan, Sri Lanka, Tibet) and East Asia (China, Korea, Japan). Attention to religious and philosophical systems as well as to continuities and changes in modern Asian culture.

## INTERNATIONAL AFFAIRS

Professors Y. Alexander (Research), W.H. Becker, E. Berkowitz, B.L. Boulter, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, J.A. Frey, R.S. Goldfarb, O. Havrylyshyn, P.P. Hill, H.C. Hinton, M.A. Holman, Y. Kim, P.F. Klarén, J.E. Kwoka, Jr., W.H. Lewis, C.A. Linden, J.M. Logsdon, J.C. Lowe, C. McClintock, J. Millar, J.A. Morgan, Jr., C.A. Moser, H.R. Nau, B. Nimer, J. Pelzman, J.M. Post, P. Reddaway, B. Reich, L.P. Ribuffo, W. Roberts, H.M.



Sachar, B.M. Sapin, C.W. Shih, G. Sigur, H. Solomon, R.H. Spector, G. Stambuk, C.T. Stewart, Jr., R. Thornton, A.M. Yezer  
 Adjunct Professors T.F. Carroll, J. Hardt, R.D.F. Palmer, E.L. Warner  
 Associate Professors C.J. Allen, M.A. Atkin, M.D. Bradley, C.J. Deering, C.F. Elliott, H.B. Feigenbaum, J. Henig, C.J. Herber, W.R. Johnson, C.C. Joyner, Y.K. Kim-Renaud, J.H. Lebovic, D.L. Lee, G. Ludlow, Y. Olkhovsky, R.W. Rycroft, S.C. Smith, M. Sodaro, H.S. Watson, S. Wolchik, R.Y. Yin  
 Assistant Professors H.L. Agnew, N.J. Brown, M.D. Moore, J.P. Rogers, N.S. Vonortas, G.C.Y. Wang

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Bachelor of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as opportunities to specialize in one of the traditional disciplines or in a regional area.

**Bachelor of Arts with a major in international affairs**—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.

3. Required courses for the major—Econ 181–82; a foreign language through the third-year level; one course selected from Geog 132, 133, 134, 135, 145, 146, 147, 154; Hist 182 and one course selected from Hist 136, 150, 157; PSc 140 and either PSc 142 or 144. Also required are two non-Western cultural courses, such as IAff 90 or 91. This requirement can also be met with 100-level courses listed below under Regional Study for Africa, East Asia, Latin America, or the Middle East. Some courses offered under IAff are also acceptable. Students must take a research methods course to be chosen from among Anth 199, PSc 101 or 104, Soc 104, Stat 51 or 53 or 111.

4. Fifteen credit hours of additional course work must be selected from one of the following group options (courses taken in fulfillment of required courses for the major may not be applied to the selected group option).

**International politics**—courses concerned with theory and practice in international affairs, forces shaping the world scene, and U.S. foreign policy, selected from Geog 127, 133, 146, 147; Hist 137, 139–40, 149; PSc 105, 106, 107, 108, 130, 131, 142, 144, 146, 149, 161, 178, 182, 183, 184, 186, or 192.

**International economics**—courses concerned with the world economy and U.S. policy and practice in international trade and finance, selected from IBus 160, 166, 173; Econ 101, 102, 104, 121, 122, 134, 151; Geog 125, 127, 133, 134, 135; Stat 111, 112.

**International communications**—courses concerned with the study of international information programs, public opinion, psychological warfare, cultural relations, and public relations, selected from Anth 150, 153, 157, 161, 162, 168; Comm 184; Geog 125; Jour 145, 146; Jour PSc 128; PSc 120, 129, 146; Psyc 115, 151, 156.

**Regional study**—a concentration in one of the following areas.

**Africa**—courses selected from Anth 178; Geog 154; Hist 116; IAff 93; PSc 180, 181, 182.

**Europe**—courses selected from Art 31, 32, 109, 110, 129, 169; Econ 147; Engl 51–52, 194; Ger 51–52, 103, 104, 114, 126; Hist 128–29, 131–32, 141–42, 147, 149, 151–52, 158;

Hmn 1–2, 4, 6; Mus 101, 102, 103, 104; Phil 50, 71, 112; PSc 105–106, 130, 131, 161.

**East Asia**—courses selected from Anth 173, 175; Chin 163–64, 179–80, 181, 182; Econ 169, 170; Geog 286; Hist 187, 188, 189, 195; Japn 111–12; PSc 170, 173, 175; Rel 2, 160.

**Latin America**—courses selected from Anth 170, 172, 185; Econ 185; Geog 161; Hist 161, 162, 163–64, 165; IAff 90; PSc 183, 184.

**Middle East**—courses selected from Anth 177; Art 116; Clas 100, 101, 102; Geog 154; Hist 158, 193, 194; PSc 176, 177, 178, 179, 180; Rel 23, 161, 164, 165.

**Soviet Union and Eastern Europe**—courses selected from Econ 133, 134; Geog 265; Hist 137, 145, 146, 188; IAff 92; PSc 108, 131 or 165, 166; Slav 71, 161–62, 165, 166.

With permission, a limited number of graduate courses may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

**90 Latin America: Problems and Promise (3)** Klarén and Associated Faculty

An interdisciplinary course in Latin American studies designed to introduce undergraduates to the diverse, rich, and complex history, politics, economy, culture, and society of Latin America.

- 91 East Asia—Past and Present (3)** Johnson and Associated Faculty  
An interdisciplinary course offering a comprehensive and integrated introduction to the civilization and present problems of East Asia.
- 92 An Introduction to the USSR and Eastern Europe (3)** Reddaway, Wolchik  
The history, politics, society, economics, and cultures of the USSR and Eastern Europe.
- 93 Africa: Problems and Prospects (3)** Hart  
Aspects of the environment, culture, and politics as they affect the present and anticipated future of Africa.
- 152 Information, Culture, and Foreign Policy (3)** Roberts  
Diplomacy in the information age; the role of communications in government-to-government relations as well as the expanding scope of government-to-people interactions, including the roles of spokesmen, the Voice of America, and the Fulbright program.
- 156 InterFuture: Independent Study Abroad (15)** Staff  
Comparative research in the United States and one or two other countries included in the InterFuture program. InterFuture scholars are selected on the basis of academic record and aptitude for independent research in a foreign environment. Enrollment limited to juniors in the Elliott School.
- 190 Special Topics in International Affairs (3)** Staff  
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*.
- 195 Internship: International Affairs (1 to 6)** Staff  
Faculty-supervised internships in the Department of State, Organization of American States, and other agencies concerned with international affairs. Admission by permission of instructor.
- 198 Independent Study and Research (1 to 3)** Staff  
Upper-division students only. Written permission of instructor required.

#### INTERNATIONAL BUSINESS

Professors P.D. Grub, G.P. Lauter, R. Eldridge (Chair), G. Ghadar, Y.S. Park, H.G. Askari  
Associate Professor F. Robles  
Assistant Professor K. Visudtibhan

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration. Please note that the following courses were formerly offered by the Business Administration Department.

- 160 Introduction to International Business (3)** Robles, Grub, Visudtibhan  
Social, cultural, political, legal, and technological environment of multinational business, emphasizing host-government/multinational corporation interface. Terminology, trade uses and practices, conditions essential for successful business operations; physical movement of goods in international business. (Fall and spring)
- 166 International Marketing Management (3)** Lauter, Robles  
Scope of international markets; factors in assessing world marketing opportunities; international marketing product, pricing, distribution, and promotion program development in dynamic world markets and global environment. Prerequisite: MLOM 140. (Fall and spring)
- 168 Foreign Market Analysis (3)** Grub  
Patterns of world trade by country, commodities, and products; selected regional analyses, in-depth market studies. Prerequisite: IBus 160, 166. (Fall and spring)
- 171 International Business Finance (3)** Eldridge, Askari  
Analysis of the international economic environment and its influence on corporate financial management of international operations. Prerequisite: Fina 120. (Fall and spring)
- 173 International Banking (3)** Ghadar, Park  
Theory and practice of international banking; analysis of international commercial and investment banking from a management perspective; subjects include current international monetary and financial environment, money in capital markets, and topical problems of international banking from a management perspective. Prerequisite: IBus 171. (Fall and spring)



**175 International Monetary and Financial Issues (3)**

Eldridge, Askari

International macro and micro issues of money, banking, and finance examined from a management perspective. Topics include international monetary systems, Eurocurrency markets, LDC debt crises, role of the IMF and World Bank, and development banking issues. Prerequisite: IBus 171 or permission of instructor. (Fall and spring)

**190 Special Topics (3)**

Staff

Experimental offering; new course topics and teaching methods.

**199 Individual Research (arr.)**

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

**ITALIAN**

See Romance Languages and Literatures.

**JAPANESE**

See East Asian Languages and Literatures.

**JOURNALISM**

Professor P. Robbins (Chair)

Professorial Lecturers F.L. Dennis, L.B. Laurent

Associate Professors C.W. Puffenbarger, J.L. Folkerts

Associate Professorial Lecturers J.P. McGill, T.O. Cron, J.R. Fogarty, D.L. Smith, R.S. Becker, J.A. Echave, N. Kingsley

Assistant Professorial Lecturers E.B. Feldman, M.C. Sheward, C. Stoltz

**Bachelor of Arts with a major in journalism**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Engl 51–52 or 71–72; Jour 71–72; PSc 1 and 2; Stat 51 or 53.
3. Required courses in the major—24 hours of second-group courses in journalism, including (a) Jour 111, 196, 198; (b) 9 credit hours chosen from Jour 121, 125, 133, 135, 137, 138, 139, 151, 155; and (c) 6 credit hours chosen from Jour 115, 116, 117, 128, 129, 140, 141, 142, 145, 146, 150, 170, 190 (only 3 credits will apply), 199.
4. Required as a secondary area of concentration—a minimum of 18 credit hours of second-group courses, chosen in consultation with the major advisor, in one other department or field of study.

Recommended electives (some of these courses may be taken to meet the general curriculum requirements of Columbian College): AmCv 71–72; Art 23; Econ 121, 142, 157, 161, 162, 181–82; Hist 71–72; Phil 45, 121; PSc 110 through 122; Psyc 115; Comm 132, 133, 134, 145; Stat 105, 129.

Enrollment into the major is restricted; contact the department office for details.

**Minor in journalism**—The student must complete 21 credit hours in journalism, including Jour 71 or 72; Jour 111; one course selected from Jour 115, 116, 117, or 170; three courses selected from Jour 121, 125, 133, 135, 137, 138, 139, 151, or 155; and any one other journalism course.

**Special Honors**—Senior journalism majors with a grade-point average of 3.5 in at least five 100-level journalism courses may apply for special honors at the start of the senior year with submitted proof of ability in print or broadcast professional media. They then must complete degree requirements with grades of A or B in at least 50 percent of all work done at this institution, must earn a grade-point average of at least 3.5 for all 100-level journalism courses taken, and, four weeks before expected graduation, must submit to the department published or broadcast professional work completed during the senior year.

**Departmental prerequisite:** Jour 111 and permission of the department are prerequisite of Jour 115, 125, 133, 135, 137, 138, 139, 151, 155, 190, and 196.

**71–72 Introduction to Mass Communication (3–3)**

Folkerts

Jour 71: Historical study of U.S. news media; political, social, and economic developments. Media relations with government and the evolving concept of

- freedom of the press. Hist 71-72 recommended. Jour 72: The U.S. press, radio, television, and other mass media. Monopoly, libel, government regulation, ethics, and news media responsibility. (Academic year)
- 111 **Reporting (3)** Robbins, Puffenbarger  
Gathering information, evaluating it, and writing news and feature stories with emphasis on print media. Historical, ethical, and legal perspectives of journalistic reporting. Assignments on campus and within the metropolitan area, with concentration on government and politics. Freshmen must obtain departmental permission before enrolling. Laboratory fee, \$50. (Fall and spring)
- 115 **Newspaper Editing and Make-up (3)** Puffenbarger  
Modern newspaper design and the editing and page layout process. Practical work in selecting and editing stories for publication; writing headlines and photo captions; selecting, sizing, and cropping photos and other graphic materials; and laying out pages. Procedures and ethics for editors and designers. Prerequisite: Jour 111 or permission of the department. (Fall and spring)
- 116 **Magazine Layout and Design (3)** Smith  
Layout, typography, and design for magazines, newsletters, house organs, and similar publications for associations, institutions, and industry. (Fall)
- 117 **Magazine Editing (3)** Stoltz  
The editor's responsibility to publisher and readers. Setting the editorial goals and planning content and production to meet them. Editing copy for general and specialized magazines. (Spring)
- 121 **Feature Writing (3)** Folkerts  
Free-lancing nonfiction articles; obtaining materials through independent investigation. Permission of the instructor required. (Spring)
- 125 **Science Writing (3)** Kingsley  
Writing science news for the mass media. (Spring)
- 128 **Government Process and the Media (3)** Manheim  
Examination of the roles played by the news media that affect the political process, including the impact the media have on the Presidency, the Congress, and the bureaucracy, and the adequacy of news organizations to provide information and analysis needed by citizens to exercise effective self-government. Same as PSc 128. (Fall and spring)
- 129 **TV News: The Politics of Visibility (3)** Larson  
Same as Comm/PSc 129.
- 133 **Advanced Reporting: Public Affairs (3)** Puffenbarger  
Coverage and writing of local and state governmental news. (Fall and spring)
- 135 **Advanced Reporting: Consumer and Service Journalism (3)** Cron  
Specialized training in writing service stories and consumer news. (Fall)
- 137 **Advanced Reporting: National Affairs (3)** Fogarty  
Coverage and writing of federal government news. (Fall)
- 138 **Investigative Reporting (3)** Puffenbarger  
In-depth reporting in selected areas of political, economic, and social affairs. Prerequisite: Jour 133 or permission of instructor. (Spring)
- 139 **Advanced Reporting: Radio and Television News (3)** Feldman  
Preparing news and public affairs programs for broadcast media. (Fall and spring)
- 140 **Photojournalism (3)** Echave  
Elements of effective news and feature photographs, including study and evaluation of slides taken by students. Picture selection, cropping, captions. Student costs include film and development of slides. (Fall and spring)
- 141 **Intermediate Photojournalism (3)** Staff  
Students take, develop, and print their own black-and-white photographs for more intensive study of news and feature pictures. Some editing, layout, and photo essays. Students purchase their own film and print paper. Laboratory fee, \$75. Prerequisite: Art 23, Jour 140. (Spring)
- 142 **Advanced Photojournalism (3)** Staff  
Picture stories and photo essays in black and white or color; emphasis on layout, captions, text. Students must purchase own film and print paper. Laboratory fee, \$75. Admission by permission of instructor. (Spring)
- 145 **Principles and Problems of Public Relations (3)** McGill, Sheward  
Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs. (Fall and spring)



- 146 Government Information (3)** Staff  
Growth of information activities in government and the role of the information specialist. Writing and editing for government information operations. (Spring)
- 150 News Coverage in Washington (3)** Puffenbarger  
The Washington news beats, channels and sources of news in the nation's capital, uses and abuses of the media. Field trips to local news centers and press briefings.
- 151 Editorial Writing (3)** Robbins  
Techniques of editorial writing, conducting the editorial page, function of editorials and columns of news commentary in a free press. Permission of the instructor required. (Spring)
- 155 Critical Writing and Reviewing (3)** Laurent  
Reviewing and commenting on the arts and entertainment for the mass media. (Spring)
- 170 News Publication Management (3)** Staff  
The business side of publishing. Study of the roles of advertising, circulation, promotion, accounting and administration, and mechanical departments in newspapers and other publications. (Spring)
- 190 Internship in Journalism (3)** Staff  
Study of a journalistic medium in action by working in a Washington area news office. Admission restricted to junior and senior journalism majors approved by a departmental committee. May be repeated for up to 9 credits. (Fall and spring)
- 195 Documentary Photography (3)** Staff  
Same as Art 195. Laboratory fee, \$75.
- 196 Senior Project (3)** Staff  
Open only to journalism majors. Major journalistic effort undertaken in consultation with a member of the journalism staff. A written request describing the project must be presented to the staff member for approval and filed with the student's advisor in the semester before registration. (Fall and spring)
- 198 Law of the Press (3)** Dennis, Becker  
Freedom of the press, censorship, legislative controls, publication as contempt of court, copyright, news-gathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy. (Fall)
- 199 Special Topics in Journalism (3)** Staff  
Selected topics: writing, editing, graphics, photojournalism, or other aspects of communication. May be repeated for credit.

## JUDAIC STUDIES

### Committee on Judaic Studies

M. Ticktin (Chair), R. Eisen, M. King, R. Krulfeld, Y. Moses, J.A. Plotz, B. Reich, H.M. Sachar, H.E. Yeide, Jr.

Columbian College of Arts and Sciences offers an interdisciplinary program in Judaic studies leading to the degree of Bachelor of Arts. This program is intended for students who wish to investigate the history, language, literature, religious and philosophical thought, and political and social experience of the Jewish people from the perspective of several academic disciplines. (Students who wish to concentrate on the religious aspects of Judaism and its relationship to the other religious traditions of the world may prefer to elect a major in religion with an emphasis on Judaism [see Religion].)

**Bachelor of Arts with a major in Judaic studies**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Clas 21–22, 23–24; Rel 9, 23.
3. Required courses for the major (30 credit hours):
  - (a) Clas 103 or 104; Hist 158; PSc 179; Rel 113–14 or 115–16, 213 or 238.
  - (b) Two related courses selected from each of two of the following groups: I—Anth 3, 124, 139, 140, 156, 171, 172, 193, 194, 250, 290, 292, 294; IV—Phil 111, 112, 113, 127, 131, 172; V—Geog 154; PSc 126, 177, 178, 277, 278, 290; VI—Rel 103, 104, 105, 107, 111, 122, 126, 137, 143, 144, 145, 146, 161, 162, 172, 174, 181, 184, 209, 291, 292. See the Graduate Programs Bulletin for 200-level courses.

Students applying for the 90-hour degree program in Judaic studies must, in addition to meeting the general requirements stated under Columbian College of Arts and Sciences, present evidence of exceptional preparation in the field of Judaism, provide strong recommendations from high school teachers and/or counselors, and complete a satisfactory interview with the Committee on Judaic Studies.

*Minor in Judaic studies*—Required: A minimum of 18 credit hours, chosen in consultation with an advisor designated by the Committee on Judaic Studies, from Clas 21–22, 23–24, 25–26, 100, 101, 102, 103, 104; Hist 156, 158; PSc 179; Rel 9, 23, 103, 107, 113, 114, 115, 116, 174, 184, 209, 213, 238.

The courses listed below pertain to Judaic studies. See the Graduate Programs Bulletin for courses at the 200 level.

- Clas 21–22 *Beginning Hebrew*
- Clas 23–24 *Intermediate Hebrew*
- Clas 25–26 *Yiddish for Reading and Conversation*
- Clas 100 *Modern Hebrew Literary Classics*
- Clas 101 *Israeli Society and Culture: Literary Perspectives*
- Clas 102 *Contemporary Israeli Short Stories and Poetry*
- Clas 103 *Modern Hebrew Nonfiction*
- Clas 104 *Modern Hebrew Fiction*
- Clas 120–21 *Advanced Hebrew Literature*
- Clas 185–86 *Directed Reading*
- Hist 156 *Jewish History from 70 A.D. to 1648*
- Hist 158 *Modern Jewish History*
- Hist 292 *Israel, Zionism, and the Arab World*
- Hmn 1 *Roots of the Western Tradition*
- PSc 176 *The Arab–Israeli Conflict*
- PSc 179 *Israeli Politics and Foreign Policy*
- Rel 9 *The Hebrew Scriptures*
- Rel 23 *Judaism: Identities and Ideas*
- Rel 103 *The Prophets*
- Rel 107 *Rabbinic Literature and Thought*
- Rel 113 *Early Post-Biblical Judaism*
- Rel 114 *Judaism in the Rabbinic Period*
- Rel 115 *Judaism in the Medieval World*
- Rel 116 *Judaism After Emancipation*
- Rel 137 *The Land of Israel and the Growth of Western Religions*
- Rel 174 *American Judaism*
- Rel 184 *The Thought of Martin Buber*
- Rel 209 *Seminar: Biblical Studies*
- Rel 213 *Seminar: Judaism in Late Antiquity*
- Rel 238 *Seminar: Contemporary Judaism*
- Rel 291–92 *Readings and Research*

#### KOREAN

See **East Asian Languages and Literatures**.

#### LATIN

See **Classics**.

#### LATIN AMERICAN STUDIES

**Program Committee:** P.F. Klarén (Director), C.J. Allen, Y. Captain-Hidalgo, C. McClintock, M. Moore, J. Quiroga, J. Treacy, R. Valero

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in Latin American studies.

*Bachelor of Arts with a major in Latin American studies*—The following requirements must be fulfilled.



1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.
3. Required courses for the major—Anth 172 or 185, 190, or 192; Econ 185; Geog 161; Hist 163–64; IAff 90, 287; PSc 183, 184; Span 1–2–3, 4, 9, 10, 55, 56, or other approved courses in Spanish-American literature.
4. Twelve credit hours of additional course work must be taken in one of the following departments: Anthropology, Economics, Geography and Regional Science, History, Political Science, and Romance Languages and Literatures (courses in Hispanic literature).
5. Students who plan to apply for graduation with Special Honors must take a research course in the field of concentration and complete an independent study project with distinction.

The following courses pertain to the Latin American studies curriculum for undergraduate students.

Anth 170	Cultures of the Caribbean
Anth 172	Cultures of South America
Anth 185	Archaeology of Meso-America
Anth 186	Archaeology of South America
Anth 190	Ethnohistory
Anth 192	Development Anthropology
Econ 185	Economic History and Problems of Latin America
Geog 161	Man and Land in Latin America
Hist 161	Revolution in 20th-Century Latin America
Hist 162	20th-Century Latin America
Hist 163–64	History of Latin America
IAff 287	Latin America: Problems and Promise
PSc 183	Governments and Politics of Latin America
PSc 184	International Relations of Latin America
Span 55	History of Spanish-American Literature from the Conquest Through Romanticism
Span 56	History of Spanish-American Literature from Modernism to the Present
Span 147	Spanish-American Polemics
Span 148	New Narrative

## LIBERAL ARTS

Advisor J. Ziolkowski

Bachelor of Arts: Program in the Liberal Arts—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Writing—6 credit hours selected from Engl 9 or 10, 11 or 13, 101, 111, and/or creative writing courses.
3. Quantitative and/or Logical Reasoning—at least 6 credit hours, chosen from the combinations of courses specified under this General Curriculum requirement or from more advanced mathematics or statistics courses if prerequisites have been met.
4. Conceptual Foundations and Development of Natural Sciences—12–16 credit hours (two 6–8 hour sequences), chosen from the combinations of courses specified under this General Curriculum requirement. One sequence must be in Group A (biology or geology) and one in Group B (chemistry and physics).
5. Social and Behavioral Sciences—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups:
  - (a) Econ 11–12 or PSc 1 and 2 or 3–4;
  - (b) Two courses chosen from Anth 2, 3, and 4; Anth 2 and 150; Geog 1 and 2; Psyc 1 and 8; Soc 1 and 2.
6. The Arts—6 credit hours, of which 3 hours must be chosen from courses specified under the General Curriculum requirement in Creative and Performing Arts. Three additional hours must be chosen from the following: any art history course (except Art 119, 162, TrDa 45, 46, 145–46, 151, 152, 153, 190, 191. Engl 81 may count toward either this requirement or the Writing requirement but not both.

7. **Literature**—12 credit hours, of which 6 hours must be chosen from the combination of courses specified under this General Curriculum requirement. Six additional hours must be chosen from literature courses offered by the Classics, East Asian Languages and Literatures, English, German, Romance Languages and Literatures, or Slavic Languages and Literatures Departments, or offered through the Honors program.

8. **Western Society and Civilization**—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups.

(a) Hist 39–40 or 71–72; if those courses have been waived, second-group courses in the History Department (except Hist 191–92 and 197) may be selected;

(b) AmCv 71–72; Art 31–32; Clas 71–72; Honr 71–72; Hmn 1–2; Hmn 4–5; Phil 51–52; Rel 1, 2. Art 31–32 may count toward either the Arts or the Western Society and Civilization requirement, but not both.

9. **Foreign Language**—6 credit hours in a foreign language beyond the second-year sequence.

10. A minimum of 36 credit hours must be taken in approved 100-level liberal arts courses (with a grade of C– or better).

Because this program allows considerable flexibility, a student should consult the advisor frequently to ensure that requirements are being addressed and that the planned program best meets the student's evolving interests and needs. The major in Liberal Arts may be combined with a second major. See Interdisciplinary Programs under *Columbian College of Arts and Sciences* for a general description of this program.

## LINGUISTICS

### Committee on Linguistics

C.W. Linebaugh (Chair), I. Azar, Y.-K. Kim-Renaud, J. Kuipers, R.M. Robin, C. Sponsler, I. Thompson

Columbian College of Arts and Sciences offers an interdepartmental program in linguistics. The purpose of the program is to provide a systematic treatment of the central issues in linguistics through courses taught under the auspices of the program and through other departments in Columbian College.

**Minor in linguistics**—15 credit hours of courses in linguistics, including Ling 101 and one course from each of the following groups. Applied Linguistics—Anth 168, 169; Chin 123–24; SpHr 118. Biological Foundations of Language—SpHr 102, 103, 120. Sociolinguistics and Historical Linguistics—Anth 161, 162; Engl 115; Phil 194. Academic advising about the minor in linguistics is available from any member of the Committee on Linguistics.

### 101 Introduction to Language and Linguistics

Development of a fundamental understanding of the nature of language and its components, including phonology, morphology, syntax, semantics, and pragmatics. Discussion of major approaches, principles, and concerns in the field of linguistics. (Spring)

## MANAGEMENT SCIENCE

Professors P.B. Vaill, J.B. Harvey, W.E. Halal, E.H. Forman, S.A. Umpleby, J.F. Lobuts, Jr., J.D. Frame, E.K. Winslow (Chair), J.H. Carson, N.M. Loeser, B. Burdetsky, P.W. Wirtz  
Associate Professors W.W. Hardgrave, J.P. Coyne, L.E. Graff, T.J. Nagy, W.C. Wells, Jr., W. Wenker, J. Liebowitz, J.M. Cary, R.G. Donnelly, R. Soyer, P.B. Malone III, M.S. Katzman  
C.N. Toftoy (Visiting)  
Instructor B. Forst (Visiting)

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration. Departments in the School of Business and Public Management have been restructured, and many courses have new designations and numbers.

### 58 Information Systems for Managers (3)

Technology, applications, and trends of business information systems. Hands-on experience in developing and/or using management information systems



- database management systems, executive information systems, decision support systems, expert systems, and structured programming. Integration of information systems into an organization. (Fall, spring, and summer)
- 107 **Fundamentals of Behavioral Science** (3) Lobuts, Winslow  
Survey of behavioral science research and practice as related to management. Emphasis on the basic human processes that contribute to the functioning of organizations. (Fall and spring)
- 110 **Human Resources Management** (3) Burdetsky, Katzman, Malone  
(Formerly BAd 110)  
The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities. (Fall and spring)
- 115 **Leadership in Human Resources** (3) Burdetsky  
(Formerly BAd 115)  
A study of the philosophy, principles, policies, and programs for effective personnel management and industrial relations as portrayed by case studies drawn from business and government. Prerequisite: Mgt 110. (Fall)
- 117 **Collective Bargaining** (3) Burdetsky  
(Formerly BAd 117)  
American unionism and collective bargaining; economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: Mgt 110. (Spring)
- 119 **Computer Programming and Data Structures** (3) Coyne, Forman, Wirtz  
For students already familiar with basic computer concepts and programming, who will learn a programming language, such as C or COBOL, useful for business applications. Emphasis on computer applications in accounting and management information systems through hands-on programming. Prerequisite: Mgt 58. (Fall and spring)
- 120 **Structured Development with CASE** (3) Carson, Wenker, Coyne  
Analysis, design, and implementation of management information systems (MIS). Structured methodologies and techniques for various stages of the MIS development process. Computer-aided software engineering tools. Prerequisite: Mgt 119 or permission of instructor. (Fall)
- 121 **Expert Database Systems** (3) Coyne, Carson, Wirtz  
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Fundamental concepts of database management and processing. Expert database systems. Hands-on experience with database management packages. Prerequisite: Mgt 119 or permission of instructor. (Spring)
- 122 **Applied Artificial Intelligence** (3) Nagy, Liebowitz  
Students use artificial intelligence software to learn knowledge representation and manipulation of knowledge and to develop business systems. Prerequisite: Mgt 120 or 121 or permission of instructor. (Spring)
- 190 **Special Topics in Management Science** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 191 **Introduction to the Computer-Based Society** (3) Wirtz  
Introduction to the role and function of computer technology in today's society. Topics include applications in office automation, business and finance, manufacturing, and education. Issue areas include changing employment patterns, computers and the individual, security and crime, and international competition. Open only to students who reside in Building JJ. (Fall)
- 192 **Our New Era: Technology and Society** (3) Wirtz  
This is the second in the sequence for the residential program Technology and Society. Students research and report on selected technology-related issues and future trends. Student groups pursue semester projects in selected computer applications areas. Open only to students who reside in Building JJ. (Spring)
- 199 **Individual Research** (3) Staff  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

**MARKETING, LOGISTICS, AND OPERATIONS MANAGEMENT**

**Professors** S.F. Divita, R.F. Dyer, S.N. Sherman, J.H. Perry

**Associate Professors** R.L. Holland, M.L. Liebrez-Himes (Chair), L.M. Maddox, P.K. Bagchi

**Assistant Professors** S.S. Hassan, P.A. Rau, C.B. Jacobina (Visiting)

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration. Please note that the following courses were formerly offered by the Business Administration Department.

- 140 Basic Marketing Management (3)** Maddox, Liebrez-Himes, Rau  
Role of marketing in the socioeconomic system, consumer behavior analysis, impact of consumerism. Major decision areas of product planning, pricing, and distribution; tools of marketing research and demand analysis. Prerequisite: Econ 11-12, Stat 51. (Fall and spring)
- 142 Consumer Behavior (3)** Dyer, Hassan  
Social, cultural, and psychological factors influencing the behavior of consumers. Models of buyer behavior, consumption patterns, market segmentation, attitude formation and change, brand loyalty, adoption of innovations, and store choice decisions. Marketing management and public policy implications of consumer research. Prerequisite: MLOM 140. (Fall and spring)
- 143 Marketing Research (3)** Dyer and Staff  
Basic methods and techniques of market research. Designing a marketing research project: research questions, secondary and syndicated data, primary data collection approaches, data analysis and report presentation. Focus group interviews, questionnaire construction, statistical software packages. Prerequisite: MLOM 140, Stat 51, Mgt 56. (Fall and spring)
- 148 Advertising (3)** Maddox and Staff  
Planning an advertising campaign. Consumer and market information, message appeals, media selection and scheduling, measuring effectiveness. Current criticism and regulation of the advertising function. Other major marketing communication tools, including personal selling and sales promotion. Prerequisite: MLOM 140, 142. (Fall and spring)
- 149 Advanced Advertising Campaigns (3)** Maddox  
An application of the principles of marketing and advertising to the development of an advertising campaign. Students perform such tasks as situation analysis, market segmentation, marketing research, media selection, and copywriting in the preparation of the advertising campaign. Prerequisite: MLOM 143, 148, or permission of instructor. (Spring)
- 150 Salesmanship and Sales Management (3)** Divita  
Development of personal selling and presentation skills; examination of types of selling situations. Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. Prerequisite: MLOM 140. (Fall and spring)
- 152 Retailing Management (3)** Staff  
A study of retailing management and strategy covering the current environment of retailing, retail market and financial analysis, store location and design, inventory management, and non-store and service retailing. Industry executive and student presentations and case analyses. Prerequisite: MLOM 140. (Fall and spring)
- 159 Marketing: Strategic Planning (3)** El-Ansary, Dyer, Liebrez-Himes  
A capstone seminar for marketing majors. Analytical integration of material covered in previous marketing courses. Marketing strategy literature, financial dimensions of marketing decisions, and comprehensive cases. Prerequisite: MLOM 142, 143, 150, and one additional marketing major field course. (Fall and spring)
- 180 Materials and Purchasing Management (3)** Perry, Sherman, Bagchi  
Product and nonproduct purchases and materials cycle management. Requirements planning and make-or-buy decisions. Source identification, qualification and selection. Pricing, inventory, control systems, buying practices, purchase records. Policy and procedure development, ethical questions. Case analyses. (Fall)
- 181 Management of Public Acquisitions (3)** Sherman  
Requirements planning, regulatory and policy environment, programming and budgeting factors, solicitation and award methods pertinent to public procurement.



ment, strategies, international purchasing, public grants, audit, and ethical considerations. (Fall)

**182 Physical Distribution Management (3)**

Bagchi

Physical distribution and warehousing systems of the United States. Economic role, modes of transport, international perspectives, private and public finance, policy issues. Traffic management, carrier management. Regulatory change, energy, environmental and safety concerns. (Spring)

**183 Logistics Management (3)**

Perry, Bagchi

Physical distribution and customer service management. Storage, inventory, financial and information implications. International distribution. Strategy formulation for the logistics system. Case analyses. (Fall)

**184 Contract Management (3)**

Sherman

The unique relationships created when independent organizations are joined by contract over long periods. Terms and conditions, specifications, information flow, progress monitoring. Direction and control problems, property issues, financial relationships, changes, schedule adherence, negotiation, termination, and audit problems. (Spring)

**188 Managing Production/Operations (3)**

Bagchi, Holland, Perry

Basic principles and methods of manufacturing production. Manufacturing facilities, plant, and equipment. Illustrations selected from various process and fabrication industries. Prerequisite: Math 51, 52; Stat 51 or equivalent; Mgt 110; SMPP 191. Restricted to seniors in the B.B.A. program. (Fall and spring)

**190 Special Topics (3)**

Staff

Experimental offering; new course topics and teaching methods.

**199 Individual Research (arr.)**

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

## MATHEMATICS

Professors T.P.G. Liverman, H. Kenyon, I. Katz (Chair), H.D. Junghenn, I.I. Glick

Adjunct Professors J. Eftis, L. Ingber (Research)

Professorial Lecturers Y. Akiyama, E. Vegh

Associate Professors M.P. Lee, E.A. Stone, M.M. Gupta, E.A. Robinson, R. Simion

Assistant Professors F.E. Baginski, D.H. Ullman, V. Harizanov, K.G. Hockett, J. Bonin

Assistant Professorial Lecturer A.I. Penn

Instructor N. Taghavi

**Bachelor of Arts or Bachelor of Science with a major in mathematics—The following requirements must be fulfilled:**

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Math 31, 32, 33, 124.
3. Required courses in the major—a minimum of 24 additional credit hours of approved

100-level courses in mathematics, including Math 106, 121, 123, 139, and 140. It is recommended that students take French, German, or Russian, and mathematically related courses in such subjects as physics, statistics, economics, and engineering.

4. Undergraduates who want honors status should contact a department advisor for a specific program. Such status may be requested as early as completion of Math 32.

**Bachelor of Arts or Bachelor of Science with a major in applied mathematics—The following requirements must be fulfilled:**

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Math 31, 32, 33, 124.
3. Required courses in the major—a minimum of 24 additional credit hours of approved

100-level courses in mathematics, including Math 111, 112, 139, 140, and 181. It is recommended that students take French, German, or Russian.

4. Required courses in a related area—12 additional credit hours to be selected in consultation with the department advisor from a mathematically related area such as economics, statistics, engineering, physics, biology, or computer science. At least 6 of these credit hours must be chosen from courses numbered 101 or higher.
5. Undergraduates who want honors status should contact a department advisor for a specific program. Such status may be requested as early as completion of Math 32.

*Minor in mathematics*—Requirements: a minimum of 18 credit hours in mathematics courses, of which at least 9 hours must be at the 100 level or higher, chosen in consultation with a departmental advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** New students should take the mathematics placement examination before registering.

- 3 **College Algebra** (3) Gupta and Staff  
Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. (Fall and spring)
- 6 **Plane Trigonometry** (3) Gupta and Staff  
Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3. (Fall and spring)
- 9 **General Mathematics I** (3) Katz and Staff  
Prime numbers, the fundamental theorem of arithmetic, rational and irrational numbers, types of numbers, geometric constructions, infinite sets. (Fall and spring)
- 10 **General Mathematics II** (3) Katz and Staff  
The highway inspector and salesman problems, chance, the fifteen puzzle and ramifications, map coloring, tiling. (Fall and spring)
- 12 **General Mathematics with Computers I** (3) Liverman  
Sets; logic; vectors and matrices. Functions and graphing instruction is accompanied by microcomputer practice, using the APL programming language. Primarily for nonscience majors. No computer experience needed. This course is an alternative to Math 9. (Fall)
- 13 **General Mathematics with Computers II** (3) Liverman  
Introduction to the basic concepts of calculus. Elements of probability theory. Elements of trigonometry. Topics are presented with microcomputer accompaniment, using the APL programming language. Primarily for nonscience majors. This course is an alternative to Math 10. Prerequisite: Math 12. (Spring)
- 30 **Precalculus** (3) Kenyon and Staff  
Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. (Fall and spring)
- 31 **Single-Variable Calculus I** (3) Kenyon and Staff  
Differentiation and integration of algebraic and transcendental functions with applications. Prerequisite: Math 30 or equivalent. (Fall and spring)
- 32 **Single-Variable Calculus II** (3) Kenyon and Staff  
Techniques of integration. Taylor formula. L'Hopital's rules. Infinite series; polar coordinates; 3-dimensional vectors. Prerequisite: Math 31. (Fall and spring)
- 33 **Multivariable Calculus** (3) Kenyon and Staff  
Vector-valued functions. Partial differentiation. Multiple integrals. Topics in vector calculus, including the theorems of Gauss, Green, and Stokes. Prerequisite: Math 32. (Fall and spring)
- 34 **Computer Laboratory for Math 31** (1) Staff  
Function tabulation, curve sketching, limits, continuity, derivatives, optimization, integrals, Riemann sums, areas. Required: Concurrent registration in Math 31.
- 35 **Computer Laboratory for Math 32** (1) Staff  
Integrals, sequences and series, parametric equations, conic sections. Required: Concurrent registration in Math 32.
- 36 **Computer Laboratory for Math 33** (1) Staff  
Partial derivatives, surfaces, level sets, extrema of functions of several variables, vector fields. Required: Concurrent registration in Math 33.
- 41 **Calculus for Economists I** (4) Junghenn and Staff  
Differentiation and integration of algebraic and elementary transcendental functions; marginal analysis for functions of one variable; optimization of functions of one variable applied to economics. Prerequisite: Math 30 or equivalent. (Fall)



- 42 Calculus for Economists II** (4) Junghenn and Staff  
Elementary linear algebra with economics applications, including input-output models; partial derivatives; multiple integrals; marginal analysis for functions of several variables; optimization of functions of several variables applied to economics; infinite series. Prerequisite: Math 41. (Spring)
- 51 Finite Mathematics for the Social and Management Sciences** (3) Glick and Staff  
Systems of linear equations, matrix algebra, linear programming, and mathematics of finance. Prerequisite: Math 3 or equivalent. (Fall and spring)
- 52 Calculus for the Social and Management Sciences** (3) Glick and Staff  
Differential and integral calculus of functions of one variable; applications to business and economics. Prerequisite: Math 51 or equivalent. (Fall and spring)
- 101 Introduction to Mathematical Logic** (3) Harizanov  
Symbolic logic as a precise formalization of deductive thought. Logical correctness of reasoning. Formal languages, interpretations, and truth. Propositional logic and first-order quantifier logic suited to deductions encountered in mathematics. Prerequisite: Math 32 or permission of instructor. (Fall, odd years)
- 102 Axiomatic Set Theory** (3) Harizanov  
Cantor's theory of sets. Russell's paradox. Axiomatization of set theory as a framework for a contradiction-free mathematics. Finite, countable, and uncountable sets; ordinal and cardinal numbers, the axiom of choice. Prerequisite: Math 101 or permission of instructor. (Spring, odd years)
- 103 Computability** (3) Harizanov  
The unlimited register machine as a model of an idealized computer. Computable functions, Church's thesis, and effective enumerability. Unsolvability of the halting problem and other theoretical limitations on what computers can do. Prerequisite: Math 32 or permission of instructor.
- 105 Problem Solving and Mathematical Proofs** (3) Ullman  
Types of reasoning encountered in mathematics. Techniques of problem solving and writing proofs. Induction. Relations. Cardinality. Introduction to the major subdisciplines of mathematics. Prerequisite: Math 32. (Spring)
- 106 Introduction to Topology** (3) Stone and Staff  
Metric spaces: completeness, compactness, continuity. Topological spaces: continuity, bases, subbases, separation axioms, compactness, local compactness, connectedness, product and quotient spaces. Prerequisite: Math 139 or permission of instructor. (Fall)
- 107 Introduction to Algebraic Topology** (3) Robinson and Staff  
The fundamental group, covering spaces, simplicial homology, and the Euler characteristic. Topics may include surfaces, knot theory, and the Jordan curve theorem. Necessary concepts from topology and algebra included. Prerequisite: Math 124 and 139 or permission of instructor.
- 111 Mathematics for Engineers and Physicists I** (3) Hockett  
Differential equations. Laplace transform. Series solutions of differential equations. Boundary value problems. Prerequisite: Math 33. (Fall)
- 112 Mathematics for Engineers and Physicists II** (3) Hockett  
Vector analysis. First- and second-order partial differential equations. Topics in complex variables. Prerequisite: Math 111. (Spring)
- 113 Introduction to Combinatorics** (3) Simion and Staff  
General introduction to combinatorial enumeration and graph theory. Basic counting techniques, inclusion-exclusion principle, recurrence relations, generating functions, pigeonhole principle, bijective correspondences, basic graph theory, applications. Prerequisite: Math 32; Math 132 is recommended but not required. (Fall and spring)
- 120 Elementary Number Theory** (3) Bonin and Staff  
Divisibility of integers, prime numbers, greatest common divisor, the Euclidean algorithm, congruence, the Chinese remainder theorem, number theoretic functions, Mobius inversion, Euler's Phi function, primitive roots and indices, applications to cryptography, and primality testing. Prerequisite: three years of high school mathematics.
- 121 Introduction to Abstract Algebra I** (3) Katz and Staff  
The concept of group, subgroups, Lagrange's theorem, normal subgroups, homomorphisms, Cayley's theorem, abelian groups, applications to counting problems, cryptosystems, integer programming, crystallographic groups. Prerequisite: Math 32 and Math 124 or permission of instructor. (Fall)

- 122 Introduction to Abstract Algebra II (3)** Katz and Sta  
The concept of ring, polynomial rings, subrings, ideals, quotient rings, unique factorization, fields, field extensions, splitting fields, geometric problems, Galois theory, block designs, error-correcting codes. Prerequisite: Math 121. (Spring)
- 123 Linear Algebra (3)** Kat  
Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition, similarity. Prerequisite: Math 124. (Fall)
- 124 Linearity and Matrices (3)** Liverman and Sta  
Linear equations, matrices, inverses, and determinants. Vector spaces, rank, eigenvalues, diagonalization, and quadratic forms. Applications to linear ordinary differential equations. Prerequisite: Math 32 or 42 or permission of instructor. (Fall, spring, and summer)
- 125 Linear Programming (3)** Kat  
Simplex algorithm, degeneracy, the assignment problem, duality theorems, postoptimality, the transportation problem, integer programming, applications. Prerequisite: Math 123 or 124, or equivalent. (Offered when demand warrants) (Fall)
- 132 Introduction to Discrete Structures (3)** Sta  
Joint offering of the Statistics and Mathematics Departments. Discrete structures and associated mathematical tools. Topics include sets, functions, relations, directed and undirected graphs, propositional calculus, Boolean algebras, with applications to computer science. Prerequisite: Stat 130 and Math 31. (Fall)
- 134 Introduction to Boundary-Value Problems (3)** Gupta and Sta  
The solution of boundary value problems in linear PDEs. Green's functions, separation of variables, Fourier analysis, Sturm-Liouville theory and methods. Prerequisite: Math 112 or 142 or permission of instructor. (Fall)
- 135 Projective Geometry (3)** Sta  
Projective spaces, projectivities, conics, pairs and pencils of conics, finite plane coordinates, collineations, Desarguesian planes, Bruck-Ryser theorem. Prerequisite: Math 121 and 123 or permission of instructor. (Spring)
- 139 Advanced Calculus I (3)** Junghenn and Sta  
A rigorous study of differentiation, integration, and convergence. Topics covered include sequences and series, continuity and differentiability of real valued functions of a real variable, the Riemann integral, sequences of functions, and power series. Prerequisite: Math 33 or equivalent. (Fall)
- 140 Advanced Calculus II (3)** Junghenn and Sta  
Continuation of Math 139. Topics covered include topology of  $\mathbb{R}^n$ , derivatives of functions of several variables, inverse function theorem, implicit function theorem, multiple integrals, Stokes's theorem. Prerequisite: Math 139 or equivalent. (Spring)
- 141 Differential Geometry (3)** Baginski  
Curves in space, regular surfaces, tensors, fundamental forms of a surface, Gauss's Theorema Egregium, Gauss-Bonnet theorem, minimal surfaces, theory of relativity. Prerequisite: Math 140; Math 123 or 124 or permission of instructor. (Fall)
- 142 Introduction to Differential Equations (3)** Glick and Sta  
Linear and some nonlinear differential equations. Topics include existence theorems, stability, control theory, limit cycles, and applications to physics and ecology. Prerequisite: Math 139 and 123 or 124, or permission of instructor. (Spring)
- 153 Introduction to Numerical Analysis I (3)** Gupta and Sta  
Accuracy and precision. Linear systems and matrices. Direct and iterative methods for solution of linear equations. Sparse matrices. Solution of nonlinear equations. Interpolation and approximate representation of functions by splines. Prerequisite: Math 33 or equivalent and some knowledge of computer programming. (Fall, even years)
- 154 Introduction to Numerical Analysis II (3)** Gupta and Sta  
Numerical differentiation and integration. Solution of ordinary differential equations. Introduction to optimization theory, gradient techniques. Least squares and applications, data fitting. Prerequisite: Math 153 or permission of instructor. (Spring, odd years)



- 157 Introduction to Complex Variable Theory (3)** Liverman and Staff  
Analytic functions. Power series. Contour integration and calculus of residues. Conformal mapping. Physical applications. Prerequisite: Math 139 or permission of instructor. (Spring)
- 168 Seminar: Curriculum Studies (3)** Staff  
Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training or students recommended by the department of education. Critical examination of secondary school mathematics, curricula, techniques and programs. Prerequisite: Math 31 and permission of instructor. (Offered when demand warrants)
- 170 Computational Complexity (3)** Harizanov  
Deterministic and nondeterministic Turing machines. Partial recursive functions and the Church-Turing thesis. Undecidable problems. Space and time complexity measures. Gap, speed-up, and union theorems. Decidable but intractable problems. The traveling salesman problem and other NP-complete problems. Prerequisite: Math 32 or permission of instructor.
- 180 Computer Mathematics and Modeling (3)** Liverman  
Introduction to the APL programming language in the context of applications to numerical methods in mathematics and the sciences. Construction of mathematical models of physical and other systems. Individual or team projects using the microcomputer. Prerequisite: Math 32; Math 124 or permission of instructor. (Fall)
- 181-82 Seminar: Applied Mathematics (3-3)** Glick and Staff  
Topics may include fractals; network flows and combinatorial optimization; linear programming automata theory and the theory of computation; information theory and coding theory; dynamical systems; queuing theory. Prerequisite: Math 124 and 139 or permission of instructor. (Academic year)
- 191 Special Topics (arr.)** Staff  
Admission by permission of instructor. May be repeated for credit. Offered upon demand.
- 195 Reading and Research (arr.)** Staff  
Under the personal direction of an instructor. Limited to mathematics and applied mathematics majors with demonstrated capability. Prior approval of instructor required. May be repeated for credit. (Fall and spring)

## MECHANICAL ENGINEERING

See Civil, Mechanical, and Environmental Engineering.

## MIDDLE EASTERN STUDIES

**Program Committee:** N. Brown (Director), M.A. Atkin, R.K. Lewis, W.H. Lewis, B. Reich, H.M. Sachar

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in the field of Middle Eastern Studies.

Bachelor of Arts with a major in Middle Eastern studies—The following requirements must be fulfilled:

1. General requirements—6 credit hours of English, 6 hours of mathematics or physical science, 6 hours of humanities, and course work in a foreign language through the third-year level. Students are encouraged to study a Middle Eastern language. Hebrew is offered regularly at GW; other Middle Eastern languages may be taken through the Consortium.
2. Social sciences—(a) Hist 40 and 72; (b) Econ 11-12 and 6 credit hours selected from 106, 151, 181, and 182; (c) PSc 1 and 2.
3. Middle Eastern studies—(a) 9 credit hours selected from Hist 107, 108, 118, 120, 193, and 194; (b) 9 hours selected from PSc 176, 177, 178, 179, and 180; (c) 6 hours selected from 113, 114, 161, 163, and 165; (d) 9 additional hours of course work related to the Middle East selected from any department.
4. Electives: Students must take sufficient electives to complete the program with 120 credit hours.

The following courses pertain to Middle Eastern studies.

- Anth 177 Cultures of the Near East  
 Art 112 Egypt and the Near East  
 Art 116 Islamic Art  
 Clas 21-22 Beginning Hebrew  
 Clas 23-24 Intermediate Hebrew  
 Clas 100 Modern Hebrew Literary Classics  
 Clas 101 Israeli Society and Culture: Literary Perspectives  
 Clas 102 Contemporary Israeli Short Stories and Poetry  
 Clas 103 Modern Hebrew Nonfiction  
 Clas 104 Modern Hebrew Fiction  
 Econ 151 Economic Development  
 Geog 154 Man and Land in the Middle East and North Africa  
 Hist 107 The Ancient Near East and Egypt to 322 B.C.  
 Hist 108 Greece and the Near East, 359 B.C. to the Second Century A.D.  
 Hist 117 Crisis or Conspiracy? A History of the International Politics of Oil  
 Hist 193 History of the Near East  
 Hist 194 History of the Modern Near East  
 PSc 176 The Arab-Israeli Conflict  
 PSc 177 Government and Politics of the Middle East  
 PSc 178 International Relations of the Middle East  
 PSc 179 Israeli Politics and Foreign Policy  
 PSc 180 Government and Politics of North Africa  
 Rel 9 The Hebrew Scriptures  
 Rel 103 The Prophets  
 Rel 113 Early Post-Biblical Judaism  
 Rel 114 Judaism in the Rabbinic Period  
 Rel 161 Islam  
 Rel 163 Islamic Religion and Art (same as Art 119)  
 Rel 164 Islamic Philosophy and Theology  
 Rel 165 Sufism (Islamic Mysticism)

## MUSIC

Professors G. Steiner (Emeritus), R. Parris

Adjunct Professor J.C. Fiorito (Voice)

Associate Professors N.A. Tilkens, R.J. Guenther (Chair)

Adjunct Associate Professor M. Garst (Piano)

Assistant Professors C.J. Pickar, L. Youens

Adjunct Assistant Professors J.E. White (Voice), S.K. Kim (Piano), J. Albertson (Guitar),  
 F.B. Conlon (Piano), M. Sislen (Guitar), A. Lee (Voice), J.D. Levy (Jazz Improvisation),  
 Assistant Professorial Lecturers B. Feinstein, C.M. Dunham, A. Wittrop, M. Peris (Piano),  
 Studio Instructors M. Findley (Violin), K. Fleming (Cello), P. Gieseler (Voice), E. Guenther  
 (Organ), N.M. Irvine (Bass), S.E. King (Recorder), L. Lipnick (Bassoon), W.H. Maas  
 (Flute), R.J. Pallansch (Tuba), R. Parnas (Violin and Viola), B.R. Seidman (Harpl.),  
 Wellman (Voice), R. White (Oboe), W.R. Wright (Clarinet and Saxophone), W.A. Baugh-  
 man (Trumpet), P. Edgar (Percussion), S.M. Fearing (French Horn), E.C. Thayer (French  
 Horn), E.U. Kiehl (Trombone), D. Marsh (Electric Bass), M. Von Villas (Opera), J.  
 Connell (Percussion), T. Perazzoli (Flute), J. Krash (Piano), T. Konstantinov (Piano),  
 Hertel (Flute), A. Robbins (Viola da gamba)

Bachelor of Arts with a major in music—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses—Mus 1-2, 5-6; 6 hours of applied music courses in the student's principal performance area.
3. The language competence option listed under General Curriculum Requirements, Columbian College of Arts and Sciences.
4. Required courses in the major—Mus 101-2, 103-4, 131-32, 138, 151; 6 additional hours of applied music courses; a minimum of 4 hours of music ensemble courses. Music majors must meet the departmental requirement for proficiency in piano. All majors are expected to attend and perform regularly in student recitals in accordance with minimum departmental requirements.

Bachelor of Music—Admission to the Bachelor of Music degree program requires demonstration of special advanced pre-admission training and aptitude. In addition to the



general requirements stated under Columbian College of Arts and Sciences, the 129-credit-hour program requires music courses as follows: Mus 1-2, 5-6, 101-2, 103-4, 131-32, 138-39, 151, 199; 6 hours of ensemble courses; 12 hours of applied music courses; 15 hours of additional courses in the area of concentration (theory or performance); and 5 hours of electives. The departmental requirement of proficiency in piano must be satisfied by the end of the junior year. Students in this program are required to pursue the language competence option listed under General Curriculum Requirements, Columbian College of Arts and Sciences.

**Minor in Music**—20 credit hours of music courses, consisting of Mus 1-2 or 5-6, two music history courses (Mus 101-2 or 103-4), 4 credit hours of piano study, and 2 credit hours of ensemble participation. Students with sufficient piano proficiency, as determined by an audition, may elect another applied music area for concentration. Recital attendance and public performance are required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental Prerequisites:** Mus 1-2 is prerequisite to all other courses required of music majors with the exception of applied music and ensemble courses. A student must achieve a grade of C or better in Mus 2 to be allowed either to declare or continue in the major. All students majoring in music are required to emphasize performance study in one instrument or voice. Placement auditions to determine the beginning level of study are administered at the time the major is declared. Satisfactory progress in the principal performance area, as determined by the department's repertoire and study-level guidelines and regular applied music jury examinations, is required for continuance in the major. Attendance at a minimum number of public concerts and recitals is required of all music majors as a part of their applied music study.

## MUSIC THEORY, HISTORY, AND LITERATURE

- 1-2 **Elements of Music Theory** (4-4) Pickar, Wittrup  
Notation, scales, keys, intervals, terms, rhythms, and chord structure and progression, both written and at the piano keyboard. Aural skills development through melodic, harmonic, and rhythmic dictation and sight singing. Introduction to music literature, with emphasis on rudimentary aural analysis. Two lab sessions per week. Mus 1 is prerequisite to Mus 2. (Academic year)
- 3 **Introduction to Musical Understanding** (3) Staff  
Introductory history of musical styles, related to listening; study of music materials and media. Not open to music majors. (Fall and spring)
- 4 **Survey of Music Literature** (3) Staff  
Introductory study of musical forms, structures, and textures; aural analysis of selected literature. Not open to music majors. (Spring)
- 5-6 **Harmony** (4-4) Parris, Wittrup  
Triads, inversions; chord analysis, construction, and progression; figured-bass realization, part writing, modulation, altered chords. Prerequisite: Mus 1-2; Mus 5 is prerequisite to Mus 6. (Academic year)
- 7 **Music of Non-Western Cultures** (3) Staff  
Introductory survey of the basic systems and styles of music in the major cultures of the Eastern Hemisphere and Africa. (Spring)
- 8 **History of Jazz** (3) Dunham  
Introduction to the styles, composers, and performers of jazz music from its origins to the present. (Fall)
- 101-2 **History of Music I** (3-3) Youens  
Development of music in the Western world from the early Christian era through the Baroque. Mus 101 is prerequisite to Mus 102. (Academic year)
- 103-4 **History of Music II** (3-3) Tilkens  
Development of Western music from the Classical period to the present. Mus 103 is prerequisite to Mus 104. (Academic year)
- 105 **Computers and Music** (3) Conrad  
Theory and practical computer applications in sound synthesis (both analog and FM digital), MIDI controlling and communication, digital sampling and recording, and manuscript preparation and editing. Music-reading ability is assumed;

- extensive computer experience and knowledge of electronic music are not required. Prerequisite: Mus 1 or permission of instructor.
- 109 **Orchestra Literature** (3) Staff  
Survey of the history and styles of orchestra literature, analysis of representative works.
- 110 **Chamber Music Literature** (3) Staff  
Survey of the history and styles of chamber music literature, analysis of representative works.
- 121 **The Opera** (3) Feinstein  
Survey of the history and styles of opera, analysis of representative works. (Fall)
- 125 **Keyboard Music Literature** (3) Tilkens  
Survey of the history, style, and major content of the keyboard literature from the 16th century to the present.
- 131-32 **Advanced Theory** (3-3) Parris  
Practice in 18th-century contrapuntal writing and analysis, chorale preludes, inventions, and fugues. Prerequisite: Mus 5-6 or equivalent. (Academic year)
- 133-34 **Composition** (3-3) Parris  
(Academic year)
- 135 **Counterpoint** (3) Parris  
Study and practice of 16th-century contrapuntal techniques. (Fall)
- 137 **Orchestration** (3) Parris  
Instrumental scoring. (Spring)
- 138-39 **Form and Analysis** (3-3) Parris  
Analysis of musical forms in representative musical literature. (Academic year)
- 151 **Conducting** (3) Wright  
Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature; practice in conducting. (Fall, odd years)
- 160-61 **Electronic Music** (3-3) Wittrop  
Tape and electronic techniques, synthesizer use, and acoustical principles. (Academic year)
- 173 **Pedagogy** (3) Staff  
Principles, materials, and methods of teaching in selected areas.
- 175 **Performance Practices in Selected Areas** (3) Carr  
An investigation of the problems of accurate interpretation of music of selected periods through the use of historical and modern literature and its application to the actual music. Topic to be announced in the *Schedule of Classes*. (Fall, odd years)
- 199 **Independent Research** (3) Staff  
Under the guidance of an assigned instructor. Open only to qualified music majors. May be repeated for credit. (Fall and spring)

### APPLIED MUSIC

Applied music courses are offered both fall and spring, and may be repeated for credit. Mus 51, 52, 53, 54, 55, 56, and 153 do not include individual lessons and do not require a supplementary fee. All other applied music courses include individual lessons and require a supplementary fee, as follows:

1. One-credit-hour courses: individual lessons of one-half hour a week, supplementary fee, \$75.
2. Two- or three-credit-hour courses: individual lessons of one hour a week, supplementary fee, \$150.

Supplementary fees for applied music courses are nonrefundable after the first three weeks of the fall and spring semesters. Consult the Music Department for details.

The supplementary fee is waived for graduate degree candidates in music and full-time undergraduate music majors and minors.

**Required practice:** three hours a week for one-credit-hour courses and six hours a week for two-credit-hour courses.

- 11 Piano (1)
- 12 Piano (2)
- 13 Voice (1)



14 Voice (2)	E. Guenther
15 Organ (1)	Staff
16 Organ (2)	Albertson, Sislen
17 Violin (1)	Parnas
18 Violin (2)	Fleming
19 Classical Guitar (1)	Irvine, Marsh
20 Classical Guitar (2)	Mann, Perazzoli
21 Viola (1)	King
22 Viola (2)	R. White
23 Cello (1)	Wright
24 Cello (2)	Wright
25 Bass (1)	Lipnick
26 Bass (2)	Fearing, Thayer
27 Flute (1)	Baughman
28 Flute (2)	Kiehl
29 Recorder (1)	Edgar, Connell
30 Recorder (2)	Seidman
31 Oboe (1)	Pallansch
32 Oboe (2)	Wright
33 Clarinet (1)	Staff
34 Clarinet (2)	Pickar
35 Saxophone (1)	Pickar
36 Saxophone (2)	Levy
37 Bassoon (1)	Staff
38 Bassoon (2)	Garst, Parris
39 French Horn (1)	Staff
40 French Horn (2)	Staff
41 Trumpet (1)	
42 Trumpet (2)	
43 Trombone (1)	
44 Trombone (2)	
45 Percussion (1)	
46 Percussion (2)	
47 Harp (1)	
48 Harp (2)	
49 Tuba (1)	
50 Tuba (2)	
51 Orchestra (1)	Preparation and performance of orchestral literature. Prerequisite: audition before director.
52 Instrumental Ensemble (1)	Chamber ensemble groups approved by audition.
53 University Singers (1)	Preparation and performance of choral literature. Prerequisite: audition before director.
54 Chamber Choir (1)	Preparation and performance of chamber vocal literature. Prerequisite: audition before director and two semesters of Mus 53.
55 Jazz Band (1)	Preparation and performance of classic and contemporary "big band" literature. Prerequisite: audition before director.
56 University Band (1)	
57 Harpsichord (1)	
58 Harpsichord (2)	
59 Jazz Performance Techniques (1)	
60 Jazz Performance Techniques (2)	
Departmental prerequisite: audition to meet departmental requirements.	
Required practice: six hours a week for 1-credit-hour courses and 12 hours a week for credit-hour courses. In addition, 3-credit-hour courses include master performance asses and require performance on student recitals.	
111 Piano (1)	Staff
112 Piano (3)	Staff
113 Voice (1)	Staff

- 114 Voice (3)
- 115 Organ (1)
- 116 Organ (3)
- 117 **Orchestral Instrument** (1)
- 118 **Orchestral Instrument** (3)
- 119 **Classical Guitar** (1)
- 120 **Classical Guitar** (3)
- 153 **Vocal Theater Workshop** (1)

E. Guenther

Staff

Albertson, Sisten

Von Villas, Conlon

A performance-oriented program for singers of various vocal abilities. May be repeated for credit. In the fall semester the stress will be on development of body awareness for the stage, acting improvisations, and character development. Scenes will be chosen (with the approval of the voice faculty) from the opera, operetta, and musical theater repertoire. In the spring semester, musical coaching, use of makeup, and audition preparation will be included.

- 155 **Voice Study for the Theatre** (1)
- 156 **Voice Study for the Theatre** (3)
- 157 **Harpsichord** (1)
- 158 **Harpsichord** (3)

Staff

Staff

Garst, Parli

## NAVAL SCIENCE

Professor O.C. Martin (Chair)

Associate Professor J.B. Carter, Jr.

Assistant Professors F.D. Forney, F.S. Turek, C. Moser, C.A. Cox, C.W. Sharkey, J.R. Wilkerson

### Naval Reserve Officers Training Corps Program

The Naval Reserve Officers Training Corps (NROTC) offers young men and women the opportunity to qualify for a full scholarship and a commission in the Navy or Marine Corps. NROTC midshipmen are required to complete the naval science courses and attend weekly professional seminars. During the summer, NROTC midshipmen participate in active duty at sea or shore-based training cruises for approximately four weeks. Upon receiving the baccalaureate and completing the NROTC program, qualified midshipmen are commissioned as ensigns in the Navy or second lieutenants in the Marine Corps. Students may join the NROTC through any one of the following four programs.

**Four-Year Scholarship Program**—Students enter the NROTC Four-Year Scholarship Program through national competition and are appointed midshipmen in the Naval Reserve. While enrolled, the government provides tuition, fees, books, uniforms, and an allowance of \$100 per month. Upon graduation, students are commissioned with an eight-year active/reserve service obligation that consists of at least four years of active duty. Scholarship Program students must include courses in English, calculus, computer science, physics, national security policy, a foreign language, technical electives, and naval science in their degree program and participate in three summer training periods of approximately four weeks each.

**Two-Year Scholarship Program**—Selection for this program is made through national competition, based on the student's academic record, physical qualifications, and an interview. Application should be made by the start of the fall semester of the student's sophomore year. Selected applicants attend six weeks of instruction at the Naval Science Institute (NSI) at Newport, Rhode Island, during the summer before their third academic year. At NSI, students take courses in naval science, physical fitness, and drill, similar to those required of four-year NROTC students during their freshman and sophomore years. Successful completion of the NSI qualifies the two-year applicants for appointment as midshipmen in the Naval Reserve and enrollment in the NROTC Scholarship Program. Upon acceptance of this appointment, students receive all the benefits and assume all the obligations of midshipmen in the Four-Year Scholarship Program.

Entering freshmen and transfer students who are awarded NROTC scholarships and placed to live on campus may also be eligible for GW Residence Hall Awards from the University. NROTC scholars with prior experience in the Navy are eligible for awards covering the average charges for on-campus housing and meals. NROTC scholars who are new to the Navy and are majoring in mathematics, chemistry, physics, or a program in the School of Engineering and Applied Science may receive \$4,000 to be applied toward the costs of on-campus housing and meals. Further information on these awards is available from the University Office of Admissions.



**Four-Year College Program**—Students are enrolled in the Four-Year College Program upon acceptance by the Department of Naval Science. Uniforms are provided, and during their junior and senior years, students receive \$100 per month. Students must include courses in mathematics, science, and naval science in their degree program, attend the first class summer at-sea training period, accept a commission in the Naval Reserve or Marine Corps Reserve on graduation with an eight-year active/reserve service obligation, and serve on active duty after graduation for at least three years. After commissioning, application for transfer to the regular Navy or Marine Corps may be made. Midshipmen who complete one term as College Program students, have a satisfactory academic record, and are physically qualified may compete for a scholarship awarded by the Chief of Naval Education and Training. College Program students who demonstrate academic excellence may be nominated for NROTC Scholarships by the Professor of Naval Science. If awarded, the scholarship will be for the remainder of the student's undergraduate enrollment, up to a maximum of three and a half years; service requirements and benefits are the same as for the scholarship programs.

**Two-Year College Program**—Application should be made by the start of the spring semester of the student's second year. Selections are made through the Chief of Naval Education and Training, based on the student's academic record, physical qualifications, and an interview. Those students selected will attend the NSI and upon successful completion may enroll in the program. The benefits and obligations are the same as for the Four-Year College Program.

**Requirements for all candidates**—Qualifications for acceptable candidates for the Scholarship Program or the College Program include U.S. citizenship, fulfillment of physical requirements, and willingness to participate in required summer training periods and to accept a commission in the Navy, Marine Corps, Naval Reserve, or Marine Corps Reserve when offered.

Enrollment in NROTC is not a requirement for taking naval science courses. Any student enrolled at George Washington University may take naval science courses with the approval of the Professor of Naval Science.

#### Degree Credit for Naval Science Courses

**Columbian College**—NSc 126, 160, and 180 are acceptable as history electives. Up to 12 credit hours (for NSc 52, 150, 175, and 176) may be accepted as professional electives in Columbian College.

**School of Engineering and Applied Science**—NSc 126, 160, and 180 may be used for social science credit. Technical elective credit is acceptable as follows: for majors in civil engineering, computer science, and mechanical engineering—NSc 52, 150, 175; for majors in computer engineering and electrical engineering—NSc 52 and 150; for majors in systems analysis and engineering—NSc 52, 125, 150, and 151.

**School of Education and Human Development**—NSc 126, 160, 175, 176, and 180 may be accepted for social science elective credit in the following undergraduate programs: elementary education, human services, and special education. All naval science courses are acceptable as elective credit in the travel and tourism and exercise and sport science programs.

**School of Business and Public Management**—NSc 175 and 176 may be used as equivalents for SMPP 191 and Mgt 110, respectively, by students in both the B.B.A. and B.Acct. degree programs. For B.B.A. students, any other naval science courses may be used to fulfill science, social science, or elective requirements. For B.Acct. students, any one of the remaining naval science courses may be used to fill an elective requirement.

**Elliott School of International Affairs**—NSc 126, 160, and 180 may be used as elective credit in all undergraduate programs.

#### 51 Introduction to Naval Science (3)

A general introduction to the naval profession and to concepts of sea power. The mission, organization, and warfare components of the U.S. Navy and Marine Corps. Overview of officer and enlisted ranks and rates, training and education, and career patterns. Naval courtesy and customs, military justice, leadership, and nomenclature. Professional competencies required to become a naval officer.

#### 52 Naval Ships Systems I (Engineering) (3)

A detailed study of ship characteristics and types, including ship design and control, propulsion, hydrodynamic forces, stability, compartmentation, and electrical and auxiliary systems. Included are basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion.

**125 Naval Ships Systems II (Weapons) (3)**

Theory and employment of weapons systems, including the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapons types, including capabilities and limitations. Physical aspects of radar and underwater sound. Facets of command, control, and communications as means of weapons system integration.

**126 Sea Power and Maritime Affairs (3)**

A survey of the U.S. naval history, from the American Revolution to the present with emphasis on major developments. The geopolitical theory of Mahan. Present-day concerns in sea power and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of U.S. and Soviet naval strategies.

**150 Navigation and Naval Operations I (3)**

Students develop practical skills in both piloting and celestial navigation. Charts, visual and electronic aids, and theory and operation of magnetic and gyrocompasses. The celestial coordinate system: spherical trigonometry, theory and operation of the sextant, and step-by-step treatment of the sight-reduction process. Other topics include tides, currents, effects of wind and weather.

**151 Navigation and Naval Operations II (3)**

A study of the international and inland rules of the nautical road, relative-motion vector-analysis theory, relative motion problems, formation tactics, and ship employment. Introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling and afloat communications.

**160 Evolution of Warfare (3)**

This course traces the development of warfare, from earliest recorded history to the present, with focus on the impact of major military theorists, strategists, tacticians, and technological developments. The student acquires a basic sense of strategy and develops an understanding of military alternatives and the impact of historical precedent on military thought and actions.

**175 Leadership and Management I (3)**

Organizational behavior and management in the context of naval organization. The management functions of planning, organizing, and controlling; individual and group behavior in organizations; motivation and leadership. Experiential exercises, case studies, and laboratory discussions. Decision making, communication, responsibility, authority, and accountability.

**176 Leadership and Management II (3)**

The interaction of leadership, organizational behavior, and human resource management. Employee interviewing and counseling, performance appraisal, military and civilian law, and managerial ethics and values. This capstone course integrates professional competencies to develop understanding of the issues faced by leaders, managers, and naval officers.

**180 Amphibious Warfare (3)**

A historical survey of the development of amphibious doctrine and the conduct of amphibious operations. The evolution of amphibious warfare in the 20th century, especially during World War II. Present-day potential and limitations of amphibious operations, including the concept of rapid deployment force.

**OPERATIONS RESEARCH**

Professors W.H. Marlow, D. Gross, N.D. Singpurwalla, A.V. Fiocco, G.P. McCormick, Falk, R.M. Soland (Chair)

Adjunct Professor R.H. Clark

Professorial Lecturers C. Anello, G.R. McNichols, D.R. Edmonds, J.F. Ince, S.E. Nevius, M.

Eskew, M.F. McGrath, L.B. Anderson, A. Greenland, N.J. Plotkin

Associate Professor T.A. Mazzuchi

Associate Professorial Lecturers W.S. Lassiter, D.J. Gantzer

Assistant Professor T.Z. Irony

Assistant Professorial Lecturers M.A. Youngren, M.A. Ahmed

See the School of Engineering and Applied Science for the program of study leading to the Bachelor of Science (Systems Analysis and Engineering).



- 101 **Survey of Operations Research: Deterministic Models** (3) Falk and Staff  
Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial, governmental, and military decision making. Linear, integer, nonlinear, and dynamic programming; networks; game theory. Prerequisite: Math 33. (Fall, spring, and summer)
- 102 **Survey of Operations Research: Stochastic Models** (3) Gross and Staff  
Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial, governmental, and military decision making. Markov chains, queuing, inventory, reliability, forecasting, decision analysis, and simulation. Prerequisite: ApSc 115, Math 33. (Fall, spring, and summer)
- 109 **Mathematics in Operations Research** (3) Fiocco, Marlow, and Staff  
Foundations of optimization theory: linear algebra, advanced calculus, real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)
- 135 **Systems Modeling for Management and Policy I** (3) Clark and Staff  
Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics: principles of systems employed to structure the problem-solving process. Problems and case studies solved using micro-computers. (Fall and summer)
- 151 **Linear Programming** (3) Falk and Staff  
The Simplex method and its variants considered from theoretical and computational points of view. Duality, sensitivity, and parametric programming. Large-scale optimization. Prerequisite: OR 101, 109 or permission of instructor. (Fall and spring)
- 173 **Discrete Systems Simulation** (3) Gross and Staff  
Monte Carlo simulation of discrete stochastic models. Simulation languages. Random-number and random-deviate generation. Statistical design and analysis of simulation experiments. Validation of simulation models. Applications: queuing, inventory, scheduling, computer models. Prerequisite: ApSc 116, CSci 51, OR 102; or permission of instructor. (Spring)
- 190 **Applied Systems Analysis and Engineering** (3) Soland and Staff  
Practical and professional aspects of systems analysis and engineering. Use of existing computer software and development of student computer programs. Analysis and solution of case studies and design problems. Students use the decision support systems laboratory. Prerequisite: CSci 144; OR 101, 102. (Fall)
- 191 **Problems in Operations Research** (3) Fiocco and Staff  
Field experience in operations research on a team basis. Each small group locates an actual problem and formulates a solution using operations research models. Prerequisite: knowledge of FORTRAN or BASIC. (Fall and spring)

## PHARMACOLOGY

Programs in pharmacology are offered at the graduate level by the Graduate School of Arts and Sciences. Courses listed here are open to interested undergraduates.

- 114 **Drugs and the Consumer** (3) Cohn and Staff  
Understanding how and why drugs produce their effects. Drugs discussed include aspirin, cold remedies, contraceptives, antibiotics, vitamins, diet drugs, antacids, and laxatives. Issues related to drug marketing, generic versus trade-names, side effects and safety, drug use during pregnancy, smoking. No science prerequisites. (Fall)
- 115 **Nonmedical Use of Licit and Illicit Drugs** (3) Cohn  
The pharmacology of alcohol, narcotics, depressants, stimulants including cocaine, and psychoactive drugs including marijuana, LSD, and PCP. Bases of drug use, dependence, and treatment. Historical, economic, political, and legal aspects of drug use. No science prerequisites. (Spring)
- 170 **Introduction to Pharmacology and Toxicology** (3) Staff  
Basic principles underlying the absorption, distribution, metabolism, and excretion of drugs and toxic substances. Mechanisms of toxicity, including mutagenesis, carcinogenesis, and specific organ toxicity. Prerequisite: permission of the instructor. Same as PubH 170. (Fall)

## PHILOSOPHY

University Professor P.J. Caws

Professors R.H. Schlagel, R.S. French, W.B. Griffith (Chair)

Associate Professors R.P. Churchill, A. Altman

Adjunct Associate Professor G.M. Bowles

Assistant Professors D. DeGrazia (Visiting), K. Oliver

Adjunct Assistant Professor J.F. Uebelhoer

**Bachelor of Arts with a major in philosophy**—The following requirements must be fulfilled.

1. The general requirements stated under Columbian College of Arts and Sciences  
2. Required courses in related areas—6 hours selected from art history, music history, or religion; 6 hours in history (Hist 39–40 recommended).

3. Required courses in the major—a minimum of 30 credit hours, including as foundational courses Phil 111, 112, 113, 131, and 152; one course selected from each of the following groups: Group A (normative)—Phil 127, 132, 142, 162; Group B (epistemological)—Phil 121, 151, 153; Group C (contemporary)—Phil 172, 192, 193, plus 6 credit hours of elective 100- or 200-level courses, selected in consultation with a departmental advisor.

For students expecting to continue in graduate school, it is recommended that they include in their programs of study 12 credit hours of introductory French, German, or Greek language courses.

**Minor in philosophy**—Required: a minimum of 18 credit hours of philosophy courses including two courses chosen from Phil 51, 52, 111, 112, 113; one course chosen from Phil 127, 131, 132, 133, 135, 142, 162; and one course chosen from Phil 121, 151, 152, 153.

**Minor in applied ethics**—Required: 18 credit hours of philosophy courses, including Phil 51 or 52, and 131 and 132, plus three courses selected from Phil 133, 135, 142, 230, 231, 235, 242, 262, which are listed in the Graduate Programs Bulletin.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

#### 45 Introduction to Logic (3)

Introduction to methods of deductive and inductive logic with emphasis on sentential calculus. Argument analysis, recognition of fallacies, legal reasoning, and practical applications of logic. (Fall, spring, and summer)

#### 51–52 Introduction to Philosophy (3–3)

Readings from major philosophers and study of their philosophical positions in historical, social, and cultural context. Phil 51: Classical, medieval, and early modern philosophers: Socrates through Locke. Phil 52: Enlightenment, 19th- and 20th-century philosophers: Locke through Sartre. Students are strongly encouraged to take Phil 51 before Phil 52. (Academic year)

#### 71 Philosophy and Literature (3)

A study of some works of literature (mainly 20th-century novels) that serve as vehicles for the working out, expression, and communication of philosophical ideas. (Spring)

#### 111 History of Ancient Philosophy (3)

History of Western philosophy from early Greece, including the Near East, with major emphasis on the Pre-Socratics, Socrates, Plato, and Aristotle. (Fall)

#### 112 History of Modern Philosophy (3)

History of Western philosophy of the 17th and 18th centuries; Continental Rationalism and British Empiricism from the scientific revolution through Enlightenment; major emphasis on Hobbes, Descartes, Spinoza, Locke, Berkeley, Hume, and Kant. (Spring)

#### 113 19th-Century Philosophy (3)

European philosophy of the 19th century, with major emphasis on Kant, Hegel, Schopenhauer, Kierkegaard, and Nietzsche. (Spring)

#### 121 Symbolic Logic (3)

Formal evaluation of deductive arguments in politics, law, economics, etc. Additional topics: metatheory of deductive systems; modal logics; logic and computers. Prerequisite: Phil 45 or permission of instructor. (Spring)



- 125 Philosophy of Race and Gender (3)** Oliver  
An examination of race and gender as social categories that define personal and social identity. Readings from Beauvoir, Fanon, Foucault, Sartre, and a variety of literary narratives. (Fall)
- 127 Theories of History and Society (3)** Altman  
Major philosophical accounts of the course of history and the origins of society, including Marxist theory and its critics. Problems of how we can explain the past and predict the future.
- 131 Ethics: Theory and Applications (3)** Griffith, Altman, DeGrazia  
Main types of ethical theory: egoistic, utilitarian, self-realization, conscience, existentialism. Applications to contemporary problems. (Fall)
- 132 Social and Political Philosophy (3)** Altman  
Philosophical theories about how economic, political, legal, and cultural institutions should be arranged. Topics include the meaning and significance of liberty, the legitimate functions of government, the nature of rights, the moral significance of social inequality, and the meaning of democracy. (Spring)
- 133 Philosophy, Nonviolence, and War (3)** Churchill  
The course will consider one or more of following topics: philosophical foundations of pacifism and nonviolent resistance; philosophical inquiry into causes and prevention of war, aggression, genocide, logical and moral problems of nuclear deterrence and national defense, and the doctrine of just war. (Fall)
- 135 Ethics in Business and the Professions (3)** Uebelhoer  
Basic concepts and theories of ethics for analysis of moral issues arising in business and professional practice. (Fall and spring)
- 142 Philosophy of Law (3)** Churchill, Altman  
Systematic examination of fundamental concepts of law and jurisprudence: special emphasis on the relationship between law and morality. (Fall)
- 151 Science and the Modern World (3)** Schlagel  
Comparison of the cosmological frameworks of Aristotle, Newton, Einstein, and quantum mechanics. Emphasis on changing concepts and methodologies, modes of explanation, and ontological implications. (Fall)
- 152 Knowledge and Reality (3)** Schlagel  
Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, the role of language in knowledge, and the meaning and criteria of truth. Prerequisite: Phil 52 or 112 or permission of instructor. (Spring)
- 153 Mind, Brain, and Artificial Intelligence (3)** Schlagel  
The mind-body problem in connection with developments in neurophysiology, cognitive psychology, and artificial intelligence. Evaluation of the major philosophical positions: dualism, epiphenomenalism, double-aspect theory, identity theory (reductive physicalism), eliminative materialism, and functionalism. (Spring)
- 162 Aesthetics (3)** Oliver  
The problem of artistic representation and the nature of aesthetic experience as related to the creation, appreciation, and criticism of art. Special emphasis on nonrepresentational works of art and their interpretation. (Fall)
- 172 American Philosophy (3)** Staff  
Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought.
- 192 Analytical Philosophy (3)** DeGrazia  
The dominant movements of recent Anglo-American philosophy—logical positivism, British ordinary language philosophy, and neopragmatism—represented by Russell, G.E. Moore, Wittgenstein, Ryle, Ayer, Goodman, Quine, etc. Prerequisite: One other second-group philosophy course. (Fall)
- 193 Phenomenology and Existentialism (3)** Caws  
Kierkegaard's existentialist reaction to Hegel; subjectivity and intentionality in 19th-century thought, leading to Husserl's phenomenology; the philosophy of existence in Heidegger and Sartre; the relation between existentialism and Marxism in the later work of Sartre. Prerequisite: One other second-group philosophy course. (Spring)
- 194 Structuralism and Hermeneutics (3)** Caws  
Structuralism in linguistics (since Saussure), anthropology (Lévi-Strauss), and literary criticism (Barthes and others) and its implications for philosophy

(Foucault). The movement will be assessed in relation to other contemporary philosophical trends, especially the hermeneutics of Gadamer and Ricoeur.

**Prerequisite:** One other second-group philosophy course.

199 **Readings and Research** (3)  
(Fall and spring)

Staff

## PHYSICAL SCIENCE

See **Chemistry**.

## PHYSICS

Professors H.H. Hobbs, O. Bergmann, A.J. Zuchelli, F. Prats, D.R. Lehman (Chair), B.L. Berman, L.C. Maximon (Research)  
 Professorial Lecturers A. Ghovanlou, J.J. Coyne, R. Eaton III  
 Associate Professors W.C. Parke, N.K. Khatchereassian, M.F. Taragin, E.P. Harper, W.I. Briscoe, J.R. Peverley, W.R. Dodge (Visiting)  
 Associate Professorial Lecturers M.T. Shams, J.T. Broach  
 Assistant Professors A. Mokhtari (Research), K.S. Dhuga, H. Haberzettl

**Bachelor of Arts with a major in physics**—The following requirements must be fulfilled:

1. The general requirements stated under **Columbian College of Arts and Sciences**
2. Prerequisite courses—Phys 13, 14, 15, 16 (or Phys 21, 5, 22, 6, and 16); Chem 11–12, Math 31, 32, 33.
3. Required courses in related area—CSci 100; Math 111–12.
4. Required courses in the major—Phys 151–52, 161, 162, 163, 164, 165–66, 167, 168, 195

**Bachelor of Science with a major in physics**—The following requirements must be fulfilled:

1. The general requirements stated under **Columbian College of Arts and Sciences**
2. Prerequisite courses—Phys 13, 14, 15, 16, (or Phys 21, 5, 22, 6, and 16); Chem 11–12, Math 31, 32, 33.
3. Required courses in related area—CSci 100; Math 111–12.
4. Required courses in the major—Phys 151–52, 163, 164, 195–96, plus three additional 100-level courses chosen with consent of departmental advisor.

For graduation with Special Honors, a student must register for Phys 195 by the beginning of the senior year. The decision to award Special Honors will be based on competency in research and general achievement in physics as evaluated by the faculty.

**Minor in physics**—Required: Phys 13, 14, 15, 16 (or Phys 21, 5, 22, 6, and 16); Phys 16 and 164 or approved substitutes from 100-level physics courses.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

### 1 General Physics I (3)

Maximon, Parke

Lecture (2 hours), recitation (1 hour). Development of the principles of classical physics. Translational motion, force, gravitation, equilibrium, momentum, work, energy, thermodynamics, waves, periodic motion, sound, fluids, solids, light, and geometrical optics. Prerequisite: Math 6 or equivalent. Concurrent registration in Phys 5 is strongly recommended.

### 2 General Physics II (3)

Parke, Zuchelli

Lecture (2 hours), recitation (1 hour). Continuation of Phys 1. Topics include electrostatics, electromagnetism, electronic circuits, electromagnetic radiation, relativity, quantum theory, and atomic and nuclear structure. Prerequisite: Phys 1 or equivalent. Concurrent registration in Phys 6 is strongly recommended.

### 5 General Physics Laboratory I (1)

Zuchelli

Laboratory complement of Phys 1 and 21. Two and a half hours. Prerequisite: concurrent or prior registration in Phys 1 or concurrent registration in Phys 2. Laboratory fee, \$40.

### 6 General Physics Laboratory II (1)

Briscoe, Zuchelli

Laboratory complement of Phys 2 and 22. Two and a half hours. Prerequisite: concurrent or prior registration in Phys 2 or concurrent registration in Phys 5.



concurrent or prior registration in Phys 2 or concurrent registration in Phys 22. Laboratory fee, \$40.

**9 Introduction to Astronomy I (3)**

Hobbs

Classical through modern astronomy, with introduction to basic principles underlying astronomical systems and observations. Lectures cover electromagnetic radiation, optical instruments, and the solar system. Laboratory (2 hours) emphasizes optics and astronomical measurements. Prerequisite: High school algebra. Laboratory fee: \$30. (Fall)

**10 Introduction to Astronomy II (3)**

Hobbs

Continuation of Phys 9. Stellar and extragalactic astronomy, including introduction to quantum aspects of electromagnetic radiation and atomic physics, stellar spectra, and stellar evolution. Laboratory (2 hours) has the same emphasis as in Phys 9. Prerequisite: Phys 9 or equivalent. Laboratory fee, \$30. (Spring)

**11-12 Introduction to Astronomy (2-2)**

Hobbs

Same as Phys 9-10 without the laboratory. (Academic year)

**13 General Physics for Engineering and Applied Science (3)**

Berman

Lecture (3 hours), recitation and laboratory (2 hours). Development of basic principles of optics and dynamics. Topics include geometrical optics, vector algebra, statics of rigid bodies, single-particle kinematics and dynamics, conservation of energy. Concurrent registration in Math 31 is required. Laboratory fee, \$40.

**14 Mechanics and Thermal Physics (3)**

Khatchereessian, Briscoe

Lecture (3 hours), recitation and laboratory (2 hours). Elementary development of mechanics for many-particle systems and basic thermodynamics. Topics include collisions, rotational motion, small vibrations, gravitation, fluid dynamics, wave motion, the ideal gas, the laws of thermodynamics, thermal properties of solids and liquids. Prerequisite: Phys 13; Math 31. Laboratory fee, \$40.

**15 Electricity and Magnetism (3)**

Habertzell, Taragin

Lecture (3 hours), recitation and laboratory (2 hours). Introductory aspects of electromagnetic theory. Topics include static electric fields, Coulomb's Law, Gauss's Law, electrical potential, capacitance and dielectrics, electric current and resistance, Ampere's Law, Faraday's Law, Maxwell's equations in integral form, electromagnetic waves. Prerequisite: Phys 14; Math 31. Laboratory fee, \$40.

**16 Modern Physics (3)**

Lehman

Lecture (3 hours), recitation and laboratory (2 hours). Basic principles of special relativity and quantum theory. Relativistic kinematics and dynamics, wave-particle duality, the hydrogen atom, atomic physics, the atomic nucleus, nuclear reactions, statistical distribution laws, applications to molecular and solid-state physics. Prerequisite: Phys 15; Math 32. Laboratory fee, \$40.

**21 University Physics I (3)**

Dhuga

Lecture (2 hours), recitation (1 hour). Physical concepts and principles are developed using calculus. Topics include classical mechanics, heat, waves, and optics. Concurrent registration in Phys 5 is required. Prerequisite or concurrent registration: Math 31. (Fall)

**22 University Physics II (3)**

Dhuga

Lecture (2 hours), recitation (1 hour). Continuation of Phys 21. Topics include electric and magnetic phenomena, relativity, atomic and nuclear physics. Concurrent registration in Phys 6 is required. Prerequisite: Phys 21; prerequisite or concurrent registration: Math 32. (Spring)

**121 Modern Cosmology (3)**

Hobbs

Nonmathematical treatment of cosmology and related subjects from astronomy and physics. Quasars, peculiar galaxies, pulsars, black holes, antimatter, etc. Prerequisite: Phys 10 or 12.

**151-52 Intermediate Laboratory (3-3)**

Dhuga

Independent advanced work to introduce students to research techniques and use of specialized instruments. Laboratory fee, \$30. (Fall and spring)

**161 Mechanics I (3)**

Prats, Khatchereessian

Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations.

**162 Mechanics II (3)**

Bergmann, Khatchereessian

Basic aspect of continua, including elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids.

- 163 Physical and Quantum Optics (3)** Peverle  
Oscillations and waves, energy and momentum of the electromagnetic field, interference, diffraction, geometrical optics, optics of crystals and other media dispersion.
- 164 Thermodynamics (3)** Parke, Taragin  
Principles and applications of equilibrium thermodynamics, reversible processes, thermodynamic potentials, stability and phase changes.
- 165-66 Electromagnetic Theory (3-3)** Zuchelli  
Development of Maxwell's field equations using vector and tensor calculus; electrostatics, stationary and nonstationary phenomena, basic circuit theory; electromagnetic waves and radiation.
- 167 Principles of Quantum Physics (3)** Habertzottl, Pratt  
Development of logical structure and experimental bases for modern quantum mechanics. Simple examples worked out to clarify the structure; primary emphasis on conceptual framework and its mathematical realization; careful consideration of the laboratory results to which the theory is a response.
- 168 Applied Quantum Physics (3)** Mokhtari, Pratt  
Explicit applications of principles of quantum mechanics to a variety of problems in atomic, molecular, and nuclear physics. Quantum statistical mechanics developed with applications in solid state. Emphasis on explicit evaluation of solutions and the techniques required. Prerequisite: Phys 167 or equivalent.
- 170 Elementary Solid-State Physics (3)** Khatcheressian  
Structure of solids, lattices and lattice defects, deformation, vibrational and electronic contribution to specific heats, binding energies, electronic states in metals and semiconductors, magnetic properties of solids. Elementary methods required such as quantum mechanics and normal mode expansions are developed as needed.
- 175 Nuclear Physics (3)** Berman, Lehman  
Introduction to application of quantum physics in the description of nuclei and their interactions. Properties of nuclei, nuclear models, nuclear forces, and nuclear reactions are considered. Specific topics include the deuteron, n-p scattering, the optical model, the shell model, the liquid-drop model, beta decay, fission, and fusion. Prerequisite: Phys 167 or permission of instructor.
- 195-96 Undergraduate Research (3-3)** Briscoe, Lehman  
Research on problems approved by the staff. For the B.A. option, emphasis will be placed on advanced laboratory experience. For the B.S. option, the two semesters will involve advanced laboratory experience and applications of computers to the solution of physics problems, respectively.

## POLITICAL COMMUNICATION

### Committee on Political Communication

J.B. Manheim (Director), W.C. Adams, R.S. French, S.G. Larson, J.A. Morgan, P. Robbins, J.E. Thiel

Columbian College of Arts and Sciences offers an interdepartmental program in political communication leading to the degree of Bachelor of Arts. Enrollment into the major is restricted; contact the program office for details.

The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses: one course chosen from Stat 53, 91, 105 (Stat 53 is usually preferred); PSc 1, 2; Econ 11 or 12; Comm 133; Jour 72.
3. Required courses in the major:
  - (a) PCm 100, 199; Comm 100, 130; Jour 111; PCm/PSc 103; PSc 120.
  - (b) Four courses selected from the following, at least two of which must be courses other than political communication. PCm 150, 191, 192, 195; Jour/PSc 128; Comm Jour 129; Comm 175, 181, 184; Jour 146, 198.
  - (c) Four additional 100-level courses offered by the Departments of Communication, Journalism, and/or Political Science.

**Special Honors**--Students with a grade-point average of at least 3.5 in all courses completed at this institution and in all courses required for the major may declare Special Honors at the beginning of the senior year. To achieve Special Honors, the student must maintain the stated grade-point requirements and present a successful oral defense.



a research paper prepared for the Senior Seminar in Political Communication before an interdisciplinary committee that includes the program director and two other faculty members nominated by the student and approved by the program director. It is recommended that students declaring for Special Honors take PCm 195 in the first semester of the senior year and PCm 199 in the second semester.

- 100 Introduction to Political Communication (3)** Manheim  
Basic concepts and theories of political communication; development of a framework for analyzing political communication; applications in the United States, other countries, and the international system. Limited to political communication majors. (Spring)
- 103 Political Communication Research (3)** Manheim  
Strategies and techniques of empirical research with application to the study and practice of political communication. Same as PSc 103. Students may not receive credit for both PCm PSc 103 and PSc 101. Prerequisite: PCm 100. (Fall)
- 150 Selected Topics in Political Communication (3)**  
Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. Prerequisite: PCm 100 or permission of the program director.
- 191-92 Field Experience (3-3)**  
Open to juniors and seniors majoring in political communication. Students spend at least 16 hours a week during the semester in an approved agency or office performing practical work in the subject under the general guidance of a faculty advisor. Grades are assigned on a pass/no pass basis only.
- 195 Independent Study (1 to 6)**  
The student pursues a program of directed reading or original research under the direction of a faculty advisor. Limited to seniors or exceptionally well-prepared juniors majoring in political communication. Before registering, the student must obtain approval of a written plan of study by the faculty member who will direct the study and the program director.
- 199 Senior Seminar in Political Communication (3)** Manheim  
Limited to majors in political communication. Selected reading and discussion with possible fieldwork in the professional subject.

## POLITICAL SCIENCE

Professors B. Nimer, H.C. Hinton, B.M. Sapin, J.A. Morgan, Jr., B. Reich (Chair), Y.C. Kim, J.M. Logsdon, W.H. Lewis, C.A. Linden, H.R. Nau, M.A. East, J.B. Manheim, C. McClintock, P. Reddaway, J. Post (Research), B.L. Kellerman (Visiting)

Associate Professors C.F. Elliott, J.R. Henig, M.J. Sodaro, S.L. Wolchik, R.W. Rycroft, C.J. Deering, C.C. Joyner, H.B. Feigenbaum, J.H. Lebovic

Assistant Professors R.P. Stoker, J.P. Rogers, V. Coleman, S.G. Larson, N.J. Brown, S.L. Wiley, S.A. Baynard (Visiting), J. Mitchell

**Bachelor of Arts with a major in political science**—The following requirements must be fulfilled:

1. The general requirements stated under *Columbian College of Arts and Sciences*.
  2. Prerequisite: PSc 1 and 2 (or the equivalent). Six courses in the social sciences, other than political science, to include 6 hours of history or 6 hours of economics. Twelve credit hours of introductory foreign language and statistics are strongly recommended.
  3. Required courses in the major: 30 credit hours of 100-level political science courses, including a distribution requirement that consists of 6 credit hours from each of the following groups. Group A (political theory and methodology)—PSc 101, 102, 104, 105, 106, 107, 108, 110; Group B (American government and politics)—PSc 111, 112, 114, 115, 116, 117, 118, 119, 120, 122, 124, 129; Group C (comparative government and politics)—PSc 130, 131, 146, 168, 170, 173, 177, 179, 180, 181, 183; Group D (international politics, law, and organizations)—PSc 140, 142, 144, 149, 161, 175, 176, 178, 182, 184, 186.
- Of the courses in Group A at least one must be PSc 101, 102, or 104, and it is recommended that this course be taken as early in the student's academic program as possible.
- Every major must complete a proseminar or, if eligible, an Honors Seminar (PSc 196, 197, 198, or 199) in the junior or senior year. A maximum of two of these may be included in a student's program; such courses do not satisfy the department's group distribution requirements. A 200-level course may be substituted for the proseminar requirement with the written permission of the instructor and the undergraduate coordinator.

The department also offers a major with a public policy focus. Students who wish to concentrate in public policy must distribute their 30 hours in political science as follows: PSc 104; 9 credit hours in policy-oriented courses to be selected from PSc 112, 117, 122, 124, 146; one policy-oriented proseminar; 3 additional credit hours from each of Groups A, B, C, D; and 3 credit hours in a political science elective at the 100 level.

Up to 12 hours of either service-learning or internship credit may be applied toward a degree. No more than 3 hours of such courses may be credited toward the major; these courses do not satisfy the distribution requirement.

Students in the 90-credit-hour degree program must receive grades of A in at least 18 credit hours of 100-level political science courses.

Students may apply for graduation with Special Honors. To qualify, the student must fulfill the general requirements stated under Regulations and take at least one political science honors seminar in which an independent study project is completed with distinction. The student must complete the seminar before the final semester of course work. The project is evaluated by a Departmental Honors Committee, which can recommend graduation with Special Honors in political science. To be eligible for enrollment in an honors seminar, students must be political science majors, have successfully completed PSc 101, have achieved a grade-point average in the major of at least 3.3, and be juniors or seniors.

**Minor in political science**—Required: PSc 1 and 2 (or the equivalent) plus 15 credit hours of 100-level political science courses, including a distribution requirement of one course from each of the four groups listed in item 3 above. A minimum of 9 credit hours of other social science courses is also required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** PSc 1 and 2 (or the equivalent) are prerequisite to all 100-level courses in political science.

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| <p><b>1 Introduction to Comparative and International Politics (3)</b><br/>Comparative and international political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. (Fall and spring)</p> <p><b>2 Introduction to American Politics and Government (3)</b><br/>Structure, powers, and processes of the American political system and the impact on public policy. (Fall and spring)</p> <p><b>3-4 Introduction to Political Behavior (6-6)</b><br/>Role of personal and social values in political behavior. Fall: Focus on problems in the American liberal tradition. Spring: A comparative perspective on democratic and authoritarian governments in the 20th century. Admission by special selection process. (Academic year)</p> <p><b>50 Washington, D.C.: History, Culture, and Politics (3)</b><br/>Same as AmCv/Hist/UPRE 50.</p> <p><b>101 Scope and Methods of Political Science (3)</b><br/>Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. (Fall and spring)</p> <p><b>102 Empirical Political Analysis (3)</b><br/>Extensive examination of empirical research methods in the analysis of political behavior. Research design, data collection (survey and aggregate), and data analysis. Prerequisite: PSc 101 or permission of instructor. (Spring)</p> <p><b>103 Political Communication Research (3)</b><br/>Same as PCm 103. Students may not receive credit for both PCm/PSc 103 and PSc 101.</p> <p><b>104 Methods of Public Policy Analysis (3)</b><br/>Introductory overview of the concepts, issues, and techniques of systematic policy analysis and its role in the policy process. (Fall and spring)</p> <p><b>105 Political Theory: Major Issues of Western Political Thought I (3)</b><br/>Foundations of Western political thought—Plato to Aquinas. (Fall)</p> | <p>Sodaro, Feigenbaum, Rogers, Brown</p> <p>Rycroft, Larson, Deering</p> <p>Staff</p> <p>Kim, Lebovic, Stoker, Wiley</p> <p>Wiley</p> <p>Manheim</p> <p>Henig, Stoker</p> <p>Linder, Mitche</p> |
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- 106 **Political Theory: Major Issues of Western Political Thought II** (3) Linden, Mitchell  
Theoretical roots of modern political order and disorder—Machiavelli to Rousseau. (Spring)
- 107 **Issues in Modern Political Thought** (3) Linden, Mitchell  
Issues of modern political thought as seen through major representative thinkers. Emphasis on conservative, liberal, and radical thought. (Fall and spring)
- 108 **Marxism-Leninism** (3) Elliott  
Intensive study of theories and philosophical assumptions of modern communism. Emphasis on Marx, Engels, and Lenin, and consideration of Bernstein, Rosa Luxemburg, Lukacs, Trotsky, and Stalin. (Spring)
- 110 **American Political Thought** (3) Morgan  
Political thought in the U.S. from colonial times to the present as seen through major representative writings. (Spring)
- 111 **State and Urban Politics** (3) Henig  
Comparative analysis of context, institutions, processes, and policies of state and urban political systems. (Fall)
- 112 **State and Urban Policy Problems** (3) Henig  
Selected issues in state and urban policy-making, with emphasis on urban and metropolitan settings. (Spring)
- 114 **U.S. Constitutional Law and Politics I** (3) Morgan  
Separation of powers, federal-state relationships, economic regulation. (Fall)
- 115 **U.S. Constitutional Law and Politics II** (3) Morgan  
Political and civil rights. (Spring)
- 116 **The American Presidency** (3) Staff  
Examination of the politics of presidential selection, the authority of the contemporary institution, the mechanisms and processes for formulating public policy, and the influences of personality on performance in office. (Fall and spring)
- 117 **Public Administration and Bureaucratic Politics** (3) Rycroft  
Basic concepts in public administration; influence of bureaucratic politics on policy formulation and implementation. (Fall)
- 118 **Legislative Politics** (3) Deering  
Theory, structure, and process of the U.S. Congress, with emphasis on elections, party organization, committees, and floor procedure, in the context of executive-legislative relations and interest-group activities. (Fall and spring)
- 119 **U.S. Political Parties and Politics** (3) Staff  
Role of parties as a linkage between mass preferences and government policies. Organization, nominations, voting, and activities in legislative and executive branches. (Fall and spring)
- 120 **Public Opinion and Political Socialization** (3) Wiley  
Sources of mass political attitudes and behavior; voting and political campaigning. (Fall)
- 122 **Science, Technology, and Politics** (3) Logsdon, Rycroft  
Multiple impacts of scientific and technological developments on the political systems. Discussion of public policies for support, use, and control of science and technology. (Fall and spring)
- 124 **Issues in Domestic Public Policy** (3) Deering, Stoker  
Examination of the decision-making process and the substance of various issues in domestic public policy in such areas as crime, economics, education, energy, the environment, poverty, and health. (Fall and spring)
- 128 **Governmental Processes and the News Media** (3) Staff  
Same as Jour 128.
- 129 **TV News: The Politics of Visibility** (3) Larson  
Examination of the impact of television on American politics and society, the nature of coverage of political issues and campaigns, the dynamics of selecting and presenting news stories. Same as Jour/Comm 129. (Fall and spring)
- 130 **Comparative Government and Politics I** (3) Feigenbaum  
Comparative political analysis with primary focus on the principal states of Western Europe. (Fall and spring)
- 131 **Comparative Government and Politics II** (3) Sodaro, Wolchik  
Government and politics of the communist nations; emphasis on the Soviet Union and countries of Eastern Europe. (Fall and spring)

- 140 International Politics (3)** Sodaro, Joyner, Lebovic, Brown  
International actors, international and domestic environments of foreign policy; global and regional patterns, general characteristics of foreign policy. (Fall and spring)
- 142 International Organizations (3)** Staff  
Development and operations of the United Nations, regional organizations, and functional international organizations. (Fall and spring)
- 144 Public International Law (3)** Joyner  
Survey of international law, with emphasis upon law's conceptual development and practical application to contemporary international issues. (Fall and spring)
- 146 U.S. Foreign Policy (3)** Sapin, Rogers  
Constitutional, political, and international factors that determine the formulation, execution, and substance of U.S. foreign policy. (Fall and spring)
- 149 Military Force and Foreign Policy (3)** Sapin, Lewis  
Impact of military considerations on U.S. foreign policy; major problems in national security, e.g., strategic weaponry, military assistance, regional security problems. (Fall and spring)
- 161 European-Atlantic Relations (3)** Staff  
International politics of the North Atlantic area, the European Common Market and U.S.-European relations. (Fall)
- 168 Soviet Foreign Policy (3)** Elliott  
Relations with the United States, Europe, the Third World, China; international communism, instruments of foreign policy; interrelationships between domestic and foreign policies; ideology and foreign policy. (Fall)
- 170 Governments and Politics of China and Northeast Asia (3)** Hinton  
Political institutions and processes of China (including Taiwan), Japan, and Korea since World War II. Influence of indigenous traditions and foreign contacts. (Fall, even years)
- 173 Governments and Politics of South and Southeast Asia (3)** Hinton  
Interaction of traditional, colonial, and contemporary influences in the domestic and international politics of the Indian subcontinent and of mainland and insular southeast Asia. (Fall, odd years)
- 175 International Relations of East Asia (3)** Kim  
Analysis of the foreign policies of selected East Asian countries and the foreign policies of major powers toward the region. (Fall)
- 176 The Arab-Israeli Conflict (3)** Reich  
Origins, evolution, and issues of the Arab-Israeli conflict. (Spring and summer)
- 177 Governments and Politics of the Middle East (3)** Reich, Brown  
Politics of the eastern Arab states, Turkey, Iran, and Israel. (Fall)
- 178 International Relations of the Middle East (3)** Reich, Brown  
Analysis of the regional and international relations of the Middle East. (Spring)
- 179 Israeli Politics and Foreign Policy (3)** Reich  
Examination of the institutions, processes, and issues of Israeli politics and foreign policy. (Fall)
- 180 Governments and Politics of North Africa (3)** Lewis  
Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. (Spring)
- 181 Politics of Middle and Southern Africa (3)** Staff  
Comparative analysis of political systems in selected countries of non-Mediterranean Africa. (Fall)
- 182 African International Politics (3)** Staff  
Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended prerequisite: PSc 181. (Spring)
- 183 Governments and Politics of Latin America (3)** McClintock  
Political processes and institutions of selected countries in South America, Central America, and the Caribbean. Emphasis on the possibilities for democracy and revolution. (Fall)
- 184 International Relations of Latin America (3)** McClintock  
U.S.-Latin American relations and foreign policies of selected states. (Spring)



- 186 U.S. Policies Toward Sub-Saharan Africa (3)** Staff  
Analysis and evaluation of contemporary U.S. policies and policy-making toward selected areas and individual countries of sub-Saharan Africa: the Horn, East Africa, western Indian Ocean states, southern Africa, Zaire, Nigeria, and Ivory Coast. (Summer)
- 187 Internship: Political Science (3)** Staff  
Study of political behavior through internship experience with Congress, executive departments or agencies, politically active private-sector groups, political parties, or electoral campaigns. Admission requires departmental approval. (Fall and spring)
- 190 Selected Topics in Political Science (3)** Staff  
(Fall and spring)
- 192 Proseminar: Political Science (3)** Staff  
Examination of selected problems in political science. Admission requires departmental approval. (Fall and spring)
- 196 Honors Seminar: Political Theory (3)** Staff  
Research on selected topics. Prerequisite: PSc 101. Admission requires departmental approval.
- 197 Honors Seminar: American Government and Politics (3)** Staff  
Research on selected topics. Admission requires departmental approval. Prerequisite: PSc 101.
- 198 Honors Seminar: Comparative Government and Politics (3)** Staff  
Research on selected topics. Admission requires departmental approval. Prerequisite: PSc 101.
- 199 Honors Seminar: International Politics (3)** Staff  
Research on selected topics. Admission requires departmental approval. Prerequisite: PSc 101.

## PORTUGUESE

See Romance Languages and Literatures.

## PSYCHOLOGY

Professors J. N. Mosél (Emeritus), R.D. Walk, A.D. Kirsch, V. Kirkbride (Emeritus), C.E. Rice, E. Abravanel, D.E. Silber, J. Miller, L.A. Rothblat, R.A. Peterson, J. Zeldner (Research), H. Weingartner, R.D. Caplan, P. Wirtz, J. Post (Research)  
Associate Professors S.A. Karp, R.W. Holmstrom, P.J. Poppen (Chair), L. Brandt, S. Hashtroudi, L.R. Offermann  
Assistant Professors C.A. Rohrbeck, F.Z. Belgrave, M.L. Jasnoski, C.E. Sager, M.C. Zee  
Assistant Professorial Lecturer C.M. Carney, K. Ross-Kidder  
Lecturer P.J. Woodruff

**Bachelor of Arts with a major in psychology**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
  2. Prerequisite course—Psyc 1.
  3. Required courses in related areas:
    - (a) Stat 53 or equivalent. Students are encouraged to take a second statistics course to meet the general curriculum requirement in quantitative and/or logical reasoning.
    - (b) 9 credit hours selected from American civilization, anthropology, economics, geography and regional science, history, philosophy (Phil 71, 113, or 151 recommended), political science, or sociology, of which 6 hours must be from anthropology, economics, history, political science, or sociology. If a student takes more than 6 hours in any one department, the excess will be credited to electives.
  4. Required courses in the major—34 credit hours in 100-level psychology courses, including three survey courses (Psyc 101, 102, and 103), principles and methods of research (Psyc 105 or 106), experimental (Psyc 118 or 121), history and systems (Psyc 196); and five additional 100-level courses.
- It is recommended that students contact their academic advisors as soon as possible for assistance in planning their programs of study.
- To qualify for graduation with Special Honors the student must fulfill the general requirements stated under Regulations, take an honors seminar (Psyc 197) or a 200-level

seminar, and complete an independent study project (Psyc 191) with distinction. The grade-point average in psychology required for graduation with Special Honors is 3.3.

*Bachelor of Arts/Master of Arts in the field of art therapy*—A five-year program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. See the Graduate Programs Bulletin.

*Minor in psychology*—18 credit hours are required, including Psyc 1 and at least three 100-level psychology courses. Students considering graduate study in psychology are advised to take Psyc 105 or 106, a distribution of courses from the categories listed under the major above, Psyc 196, and an elementary course in statistics.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- |       |  |  |
|-------|--|--|
| 1     | <b>General Psychology (3)</b>  | Staff                                    |
|       | Fundamental principles underlying human behavior. (Fall and spring)  |  |
| 8     | <b>Psychology of Motivation and Personality (3)</b>  | Staff                                    |
|       | Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. (Fall and spring)   |  |
| 22    | <b>Introduction to Educational Psychology (3)</b>  | Kirkbridge                               |
|       | The contributions of psychology to education; emphasis on learning. Includes fieldwork. (Spring)   |  |
| 101   | <b>Abnormal Psychology (3)</b>   | Rohrbeck, Silber, Holmstrom, Weingartner |
|       | Causes, diagnosis, treatment, and theories of various types of maladjustment and mental disorders. (Fall and spring)   |  |
| 102   | <b>Social Psychology (3)</b>   | Belgrave                                 |
|       | Social foundations of behavior: cognition, motivation, role behavior, communication, small-group processes, and attitudes. (Fall and spring)   |  |
| 103   | <b>Psychology of Childhood (3)</b>   | Brandt, Rohrbeck                         |
|       | Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world.  |  |
| 104   | <b>Ecology and Mental Health (3)</b>   | Kary                                     |
|       | Examination by field research of the linkages between aspects of the physical environment and mental health. Tutorials, conferences, and student field research projects. (Fall)   |  |
| 105-6 | <b>Principles and Methods of Psychology (4-4)</b>  | Walk, Hashtroudi                         |
|       | Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior; individual and class experiments performed. Psyc 105: sensation, perception, and emotions and their relation to adaptive behavior. Psyc 106: memory, human information processing, learning, and motivation. Laboratory fee, \$30 per semester. (Academic year) |  |
| 108   | <b>Humanistic Psychology (3)</b>   | Staff                                    |
|       | Critical examination of humanistic psychology. Emphasis on role of consciousness in human behavior. Philosophic foundations, existential, phenomenological, and transpersonal psychology. (Spring)   |  |
| 110   | <b>Perception and Understanding in Children (3)</b>  | Abravanel                                |
|       | Concepts and research in the area of developmental psychology; emphasis on growth and development of thinking, perceiving, and symbolic activity. (Spring)   |  |
| 112   | <b>Psychology of Adolescence (3)</b>   | Staff                                    |
|       | Psychological characteristics and problems peculiar to adolescence, with emphasis on application of psychology to solution of such problems. (Fall and spring)   |  |
| 115   | <b>Psychology of Language and Communication (3)</b>  | Staff                                    |
|       | Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in perception and memory, linguistics programming. (Fall)   |  |
| 118   | <b>Neuropsychology (3)</b>   | Robble                                   |
|       | Analysis of neural processes underlying behavior. Basic structure and function of the nervous system, with emphasis on sensory processes, learning and memory, motivation, and emotion. (Fall and spring)  |  |



- 119 Group Dynamics (3)** Miller  
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportunity is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited. (Spring)
- 121 Psychology of Learning (3)** Hashtroudi  
Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects. (Fall)
- 122 Psychology and Human Relations (3)** Silber  
Understanding human relations and T-group techniques by evolving an on-going T-group within the course itself. For junior and senior undergraduate social science majors; open to others with permission of instructor. (Summer)
- 128 Health Psychology (3)** Jasnoski, Belgrave, Peterson, Poppen  
Current research in the area of health psychology, with special attention to psychological factors related to health and illness, psychological intervention with medical patients, and psychological approaches to illness prevention and health promotion.
- 129 Theories of Personality (3)** Poppen, Rice, Jasnoski  
Survey of personality theories; emphasis on their application to problems of individuals. (Fall and spring)
- 130 Seminar: Political and Social Implications of Current Approaches to Psychological Treatment (3)** Karp  
Presentation and discussion of recent work, such as that of Szasz and Goffman, bearing upon the implications for individuals and society of various approaches to psychological treatment, including psychotherapy and behavior modification.
- 131 Psychological Tests (3)** Holmstrom, Karp  
Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, \$25. (Fall and spring)
- 132 Socialization in Childhood (3)** Brandt  
Examination of primary methods by which the child is shaped in terms of social judgment and self-control; internalization of controls, assimilation of societal values and parenting procedures. Organized by focus on issues according to developmental level.
- 135 Freud and Modern Psychoanalysts (3)** Miller  
Introduction to the work of Freud and his impact on modern psychoanalysis, focusing on the meaning of dreams and the unconscious function of conflict and defense, infantile sexuality and the Oedipus conflict, development of the ego, theory of anxiety and neurosis, and the death instinct. (Spring)
- 144 Industrial/Organizational Psychology (3)** Sager, Offermann, Caplan  
Psychological concepts and methods applied to problems of personnel management, employee motivation and productivity, supervisory leadership, and organizational development. (Fall and spring)
- 150 Psychology of Sex Differences (3)** Poppen  
Relevant biological, psychological, and sociological influences on males and females in the development of sex differences, hormonal differences, gender identity, differential socialization of sons and daughters, masculinity femininity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. (Spring)
- 154 Psychology of Crime and Violence (3)** Silber  
Examination of many psychological aspects of criminal behavior; personality of criminals and of psychological processes affecting behavior
- 156 Psychology of Attitudes and Public Opinion (3)** Carney  
Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.
- 170 Clinical Psychology (3)** Zea, Peterson  
An exploration of the history, functions, and problems of the clinical psychologist. Assessment, treatment, community approaches, ethics. Prerequisite Psyc 101, 131.

- 188 **Attitudes Toward Death and Dying** (3) Woodruff  
Exploration of the many different aspects, attitudes, and experiences associated with the process of death and dying. Limited to juniors and seniors.
- 191 **Independent Research in Psychology** (3) Staff  
Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)
- 192 **Field Experience in Psychology** (3) Abravanel  
Senior psychology majors will spend a minimum of six hours a week in a local mental health, rehabilitation, school, or community setting. Students registering for this course must have blocks of time available in their class schedules (Fall and spring)
- 196 **History and Systems of Psychology** (3) Rice, Walk  
Senior capstone course that includes a survey and integration of the major viewpoints and concepts of psychology. Required of psychology majors. (Fall and spring)
- 197 **Honors Seminar in Psychology** (3) Staff  
Selected topics in psychology that change from semester to semester. Intended primarily for juniors who plan to enroll in Psyc 191 in the senior year and for students in the Special Honors program in psychology. May be repeated for credit.
- 198 **Current Research Issues in Psychology** (3) Staff  
Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. May be repeated for credit.

## PUBLIC ADMINISTRATION

Programs in public administration are offered at the graduate level by the School of Business and Public Management. The course listed here is open to interested undergraduates.

### 125 **Managing Public Policy** (3)

Contemporary concepts and issues in public administration and management. Major trends and approaches to governmental administration in the U.S., including the changing federal role, roles of the public sector in relation to the private sector, and managing public agencies at all levels. (Fall and spring)

## RELIGION

University Professor S.H. Nasr

Professors R.G. Jones, H.E. Yeide, Jr. (Chair), D.D. Wallace, Jr., A.J. Hildebeitel

Associate Professorial Lecturer E.S. Jospe

Assistant Professors S.A. Quitslund, R.J. Elsen

**Bachelor of Arts with a major in religion**—The following requirements must be fulfilled

1. The general requirements stated under Columbian College of Arts and Sciences
2. **Prerequisite courses**—Rel 1, 2.
3. Four required courses in related areas—(a) 6 credit hours in studies of cultures other than American and English (preferably a foreign language), and (b) 6 credit hours in either literature, philosophy, or history.
4. Required courses in the major—30 credit hours, including at least 21 hours of upper-level courses. Twelve of these hours must be chosen from one of the following religious traditions: Christianity, Hinduism, Islam, and Judaism. Appropriate graduate seminars may be approved as substitutions for advanced-level courses. The program must include Rel 101 and at least one course each in Hebrew Scriptures and in New Testament.

Special Honors are awarded to students who meet the requirements stated under Regulations and who complete an honors thesis by enrolling in Rel 191.

It is recommended that students include the study of foreign languages in their undergraduate program, including a language crucial to one of the religious traditions. A students expecting to enter graduate school are urged to study French or German.



**Minor in religion**—Required: a minimum of 18 credit hours in religion, of which at least 6 must be upper-level courses. The minor program will be developed in consultation with the departmental advisor. Rel 101 is strongly recommended for all participating students.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**1 Introduction to World Religions: West (3)**

Staff

Examination of the religions of the ancient Mediterranean and the major religions of the West. Religious foundations of Western civilizations. The development of Judaism, Christianity, and Islam and their confrontations with secularization and political upheaval in the modern world. (Fall and spring)

**2 Introduction to World Religions: East (3)**

Staff

Examination of the major religions of the East and comparison with religions in the West. Approaches to the cross-cultural study of religion. Hinduism, Buddhism, and the religions of Tibet, China, and Japan are studied with respect to their history and their encounter with modernity. (Fall and spring)

**9 The Hebrew Scriptures (3)**

Jones

The history, literature, and religious thought represented by the Hebrew Scriptures (Old Testament). Continuities and contrasts between Israel and the ancient Near East are considered through study of the world view, oral and literary tradition, main religious ideas, and chief figures and movements of the biblical literature. (Fall and spring)

**10 The New Testament (3)**

Jones

Literature and history of earliest Christianity in the setting of the religious movements of the Greco-Roman world and developments within Judaism. The meaning of the earliest Christian proclamation about the significance of the life, teaching, and death of Jesus of Nazareth becomes the basis for tracing the formation and expansion of the Christian movement. (Fall and spring)

**23 Judaism: Identities and Ideas (3)**

Eisen

Exploration of important practices and beliefs in classical and modern times. Study of people and texts that confront tradition and change. This course presents several academic approaches to the description and definition of Judaic ways of life. Readings and discussions focus on the myths and rituals of Judaism. (Fall and spring)

**101 Theories in the Study of Religion (3)**

Hiltebeitel

Seminar taught jointly by the faculty of the Department of Religion. Analysis of different ways in which religious phenomena can be approached. Readings and discussion of some of the epoch-making books in the development of the study of religion.

**103 The Prophets (3)**

Quitslund

Development of the prophetic movement in Israel; cultural, economic, literary, and religious dimensions; elements of lasting value in the prophetic teaching. Study of selected prophets.

**104 The Life and Thought of Jesus (3)**

Quitslund

Comprehensive study of the life and teachings of Jesus with critical attention to sources. Quest for the historical Jesus.

**105 The Life and Thought of Paul (3)**

Quitslund

Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.

**107 Rabbinic Literature and Thought (3)**

Eisen

Readings of the Mishna, Tosefta, Talmuds, midrashim, and liturgical works in English translation. Methods of literary and historical analysis introduced and applied. Individual research projects.

**111 Myth, Epic, and Novel (3)**

Hiltebeitel

Religious themes and images of the hero and their cultural significance in literature: e.g., Indo-European, Biblical, Babylonian narrative traditions; Greek epic and drama; Dante, Milton, Dostoevsky, Kafka, Hesse, Faulkner, Beckett.

**113 Early Post-Biblical Judaism (3)**

Eisen

History of Judaism from the time of Ezra through the destruction of Jerusalem in 70 CE—canonization of the Pentateuch, Hellenism, Maccabean revolt, growth of

- sectarian movements, Herod, ferment against Rome in context of Eastern and Western political currents. Use of primary sources, especially the Bible, Josephus, and rabbinic and noncanonical writings.
- 114 **Judaism in the Rabbinic Period** (3) Eisen  
From 70 CE through end of rabbinic period. Focus on religious responses to destruction of the Temple; apocalyptic thinking and revolt of Bar Cochba; rabbinic and patriarchal responses to Roman authority; Tannaitic and Amoraic Judaism in Palestine and Babylonia; mystical and folk religion phenomena preserved in art and literature.
- 115 **Judaism in the Medieval World** (3) Eisen  
History of relations between Jews and non-Jews. Daily life and education of the ordinary Jew; rabbinical law and interpretation of scripture; Jewish philosophers, mystics, sects, and messianic movements.
- 116 **Judaism After Emancipation** (3) Eisen  
Transformation of community and beliefs among Jews beginning with catalyst of their political emancipation. Responses to beginnings of modernity among Jews in Europe, America, and Israel.
- 121 **Ethics and the World Religions** (3) Yeide  
Modern concepts of ethics and their relation to major world religions; religion as stimulus and barrier to moral change, modern moral issues and religious ethics.
- 122 **Christian Ethics and Modern Society** (3) Yeide  
Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to various social institutions.
- 124 **Contemporary Movements in Theology** (3) Quitslund  
Theological approach and systems of a selected number of modern theologians and/or theological movements such as process theology, liberation theology.
- 126 **Western Mysticism** (3) Quitslund  
Study of the phenomenon of religious experience and of selected mystics in Judaism, Christianity, and Islam.
- 127 **Medicine, Religion, and Healing** (1) Yeide  
Total care concept. Importance of religion in medical practice for patient and physician. Concept of the professional, the clergy's role in healing, religious perspective on issues in medical ethics.
- 134 **The Holocaust in Film and Literature** (3) Staff  
Study of artistic responses in fiction and nonfiction to a period of supreme importance in Jewish and world history; the attempts on screen and in print to confront and understand this modern catastrophe.
- 143 **Early Christianity and the Spiritual Life of the Ancient World** (3) Wallace  
Rise and development of Christianity in relation to the culture, philosophy, mystery religions, and general religious life of the Greco-Roman world, A.D. 500.
- 144 **Medieval Faith and Symbolism** (3) Wallace  
Christian life and thought in the Middle Ages; mystics, saints, popes, and philosophers.
- 145 **Religious Currents in the Renaissance and Reformation** (3) Wallace  
Transformation of Western man's understanding of his identity and destiny from the end of the Middle Ages to the Age of Reason.
- 146 **Christianity from the Enlightenment to Existentialism** (3) Wallace  
Changes in Christian life and thought since 1700, as seen in theology, literature, political life, and religious institutions.
- 155 **Anthropological Approaches to Religion** (3) Simons, Wagner  
Same as Anth 155.
- 157 **Indian Philosophy and Mysticism** (3) Hiltoberry  
Indian speculative and mystical traditions; late Vedas, Upanishads, Bhagavad Gita, Buddhist, and Hindu soteriological systems.
- 158 **Hinduism** (3) Hiltoberry  
Study of continuity and change in Hinduism, with emphasis on historical development and the consolidating features of the religion. Attention to relations between classical and popular living forms.
- 159 **Mythologies of India** (3) Hiltoberry  
The lore of Indian gods (Vedic, Puranic), heroes (epics), and holy men (Hindu, Buddhist, Jain, Tantric); ties with Indian art, caste, cult, cosmology, and spiritual ideals.



- 160 **Buddhism** (3) Hiltebeitel  
Origin, development, and contemporary status of Buddhist life and thought; its impact on Asia.
- 161 **Islam** (3) Nasr  
Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East.
- 162 **Symbolism in the History of Religions** (3) Hiltebeitel  
Religious symbolism, myth, legend, and ritual in the religions of the world; various theoretical analyses.
- 163 **Islamic Religion and Art** (3) Nasr  
Investigation of major forms of Islamic art, such as calligraphy, architecture, and urban design; Quranic chanting, poetry, and music in relation to the principles of Islamic revelation. Same as Art 119.
- 164 **Islamic Philosophy and Theology** (3) Nasr  
The major schools of Islamic philosophy and theology, considered in both a morphological and historical manner. The relation between revelation and reason, determination and free will, and divine and human knowledge as well as the relation among science, philosophy, and religion. The development of various schools of thought, from the classical period to the present.
- 165 **Sufism (Islamic Mysticism)** (3) Nasr  
The foundation of Sufism in the Quranic revelation, its subsequent development, and its significance within Islamic civilization. Doctrines and practices of Sufism; history of the Sufi orders: Sufi literature, particularly in Arabic and Persian. The influence of Sufism upon social and political life and its state and role in the contemporary world, both Islamic and non-Islamic.
- 172 **Religion in American Culture** (3) Wallace  
Growth of religious groups and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene.
- 174 **American Judaism** (3) Eisen  
Religious thought and institutions with emphasis on contemporary Judaism. Mythic and ritual life of American Jews, including responses to Israel, diaspora, the Holocaust, family and community dynamics.
- 181 **Women in Western Religion** (3) Quitslund  
Historical, theological, and ethical investigation of the image and role of women in Judaism and Christianity; special consideration of the Biblical experience, the sexual qualifications for religious office, use of male and female images and languages, and contemporary issues.
- 183 **Individualism, Reason, and Tradition in Early Modern Europe** (3) Kennedy  
Same as Engl/Fren/Ger/Hist 183 and Art 187.
- 184 **The Thought of Martin Buber** (3) Jospe  
Basic principles underlying the Life of Dialogue and application of those principles to all strata of life from interpersonal relationships to the religious realm.
- 190 **Selected Topics in Religion** (3) Staff  
Critical examination of religious phenomena rendered timely by current events or special resources. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.
- 191 **Senior Honors Thesis** (3) Staff  
Required of and open only to undergraduate honors candidates in religion. (Fall and spring)

# ROMANCE LANGUAGES AND LITERATURES

Professors J.A. Frey, J.F. Burks, I. Azar, P.G. Sáenz  
Associate Professors M.A.B. Coffland, G. Ludlow, J.F. Thibault (Chair)  
Assistant Professors G.P. Huvé, Y. Captain-Hidalgo, J.A. Quiroga, R. Valero, I.R. Vergara,  
E. Marder

Adjunct Assistant Professors M. Ferretti, R. Verona, M.N. Ament, L. Franklin, D. Konz  
Bachelor of Arts with a major in (1) French language and literature, (2) Spanish language and literature, (3) Spanish-American literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses—Fren-Span 1–2–3, 4, 8 or 9, 10, 30, or equivalent
3. Required for the majors—Fren 53, 54, and 90, or Span 53, 54, and 90, or Span 55, 56 and 90; plus 15 credit hours of 100-level courses, of which 9 hours must be in literature. The student is expected to demonstrate a knowledge of his or her field in breadth and depth by passing a comprehensive examination at the end of the senior year. A proseminar (Fren Span 199–200) is required.

Minor in French or Hispanic languages and literatures—Required: 9 credit hours chosen from Fren or Span 30, 53, 54, 90 and Span 55, 56; 12 additional hours selected from among French or Spanish courses numbered 8 and above, including at least 6 credit hours of 100-level courses.

**Placement Examinations:** A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

## FRENCH

**Departmental prerequisite:** Fren 4 or equivalent is prerequisite to all courses in French from Fren 8 and above.

### 1 Introductory French I (4)

First-semester French. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$35. (Fall, spring, and summer)

### 2 Introductory French II (4)

Second-semester French. Emphasis on communication, composition, and reading. Prerequisite: Fren 1 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

### 3 Intermediate French (4)

Third-semester language study. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Fren 2 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

### 4 Language and Culture (3)

Fourth-semester language study. History, geography, and culture of France, with emphasis on conversation and composition. Prerequisite: Fren 3 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

### 8 The Language of Business, Commerce, and Management (3)

Fifth-semester language study, refining of general linguistic competence; introduction to French economic life; the language of business and finance. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Fren 4 or equivalent. Students who receive credit for Fren 8 cannot receive credit for Fren 9. Material fee, \$35. (Fall)

### 9 Contemporary Institutions (3)

Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Material fee, \$35. Prerequisite: Fren 4. Students who receive credit for Fren 9 cannot receive credit for Fren 8. (Fall, spring, and summer)

### 10 Press, Communication, and Politics (3)

Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of France and the Francophone world. Material fee, \$35. Prerequisite: Fren 8 or 9. (Fall, spring, and summer)

### 20 French Pronunciation (3)

The sounds of French. Oral readings, presentations, recitation. Poetry, selected from plays. Emphasis on phonetics and diction, with attention to accent, rhythm, and intonation. Prerequisite: Fren 10. Laboratory fee, \$35. (Spring)

### 30 General Readings in French Literature (3)

Readings in prose, poetry, and drama. Introduction to techniques of literary criticism, attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Fren 10. (Fall and spring)



- 49 **French for Graduate Students** (0) Staff  
For graduate students preparing for reading examinations. No academic credit.  
Tuition is charged at the rate of 3 credit hours (Fall, spring, and summer)
- 53 **History of French Literature from the Middle Ages Through the 17th Century** (3) Burks, Coffland  
Lecture and discussion in French. Development of genre and movements.  
Selected readings across these periods plus the reading of complete texts of  
epics, essays, novels, and plays. Prerequisite: Fren 30 or equivalent. (Fall)
- 54 **History of French Literature from the 18th Through the 20th Century** (3) Burks, Coffland  
Lecture and discussion in French. Philosophical and literary movements of the  
modern period. Selected readings across the period plus the reading of complete  
texts of novels and drama. Prerequisite: Fren 30 or equivalent. (Spring)
- 90 **Textual Analysis** (3) Burks  
Methodology and vocabulary of literary criticism. Application of various principles  
of textual analysis and critical approaches to literature. Prerequisite: Fren 30  
or equivalent. (Spring)
- 108 **Advanced French Grammar and Style** (3) Thibault and Staff  
Composition, drills, dictations. Translations into French. Study of vocabulary  
and syntax, with emphasis on stylistic devices. Prerequisite: Fren 10.  
(Fall)
- 109 **Contemporary France** (3) Huvé and Staff  
Emphasis on advanced oral work. Discussion of French culture and civilization,  
based on contemporary writings and video documents. Material fee, \$35. Prerequisite: Fren 10. (Fall)
- 110 **Business and Commercial French** (3) Staff  
Structure and language of French economic institutions. Discussion of legal,  
financial, and administrative documents. Oral and written reports. Preparation  
for the certificate of the Paris Chamber of Commerce. Prerequisite: Fren 10.  
(Spring)
- 120 **Studies in Medieval French Literature** (3) Coffland  
Readings and analysis of the major literary texts from the 11th through 15th  
centuries. *Chansons de geste*, courtly literature, *fabliaux*, drama, lyric and didactic  
poetry. (Fall)
- 121 **French Literature of the Renaissance** (3) Burks and Staff  
The development and maturation of humanistic ideals in France during the 16th  
century. Rabelais, Montaigne, and *La Pléiade*.
- 122 **The Age of Classicism** (3) Burks, Ludlow  
Drama, philosophy, criticism, poetry, and fiction of the 17th century. Study of  
major social, political, and religious movements: *préciosité*, Baroque, Jansenism,  
rationalism.
- 123 **The Age of Enlightenment** (3) Ludlow  
Study of major novelists, dramatists, philosophes, and ideologues of the 18th  
century. The influence of the works of Montesquieu, Voltaire, Diderot, and  
Rousseau on European and American thought of the period.
- 124 **19th-Century French Literature** (3) Frey, Thibault  
Study of the major literary movements of the 19th century from romanticism to  
symbolism. Emphasis on stylistic analysis of major poems, novels, and dramas.  
(Spring)
- 125 **Studies in 20th-Century French Literature** (3) Coffland, Thibault  
The major literary movements of the 20th century: *avant-garde*, surrealism,  
existentialism, *nouveau roman*, and *nouveau théâtre*.
- 130 **Theory of Poetic Discourse** (3) Frey  
An examination of the creation and evolution of poetic genres. Textual analysis of  
major French poets. (Fall)
- 131 **Theory of Narrative Discourse** (3) Thibault, Marder  
Study of the various traditions in the novel, from its medieval origins to the  
present. (Spring)
- 132 **Theory of Drama** (3) Burks, Marder  
Study of major dramatic genre. Medieval forms, classic tragedy and comedy;  
Romantic drama and melodrama; *fin de siècle*; contemporary theatre.

- 133-34 **Special Topics in French Literature** (3-3) Thibault, Burks  
May be repeated for credit provided the topic differs. Fall 1991: Art and literature from Romanticism to Impressionism. Spring 1992: The Jansenist tradition in French literature.
- 199-200 **Proseminar** (3-3) Staff  
Required of all majors; preparation for the major field examination. Conferences, group discussion, practicum; literature in relation to the other arts and the social sciences. Fren 199: textual analysis, literary criticism, theory, and methods. Fren 200: the concepts of literary history and the history of French literature; periods, authors, genres, topics. (Academic year)
- 299-300 **Thesis Research** (3-3) Staff  
(Fall and spring)

## ITALIAN

- 1 **Introductory Italian I** (4) Coffland and Staff  
First-semester Italian. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$35. (Fall, spring, and summer)
- 2 **Introductory Italian II** (4) Coffland and Staff  
Second-semester Italian. Emphasis on communication, composition, and reading. Prerequisite: Ital 1 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)
- 3 **Intermediate Italian** (4) Coffland and Staff  
Third-semester Italian. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Ital 2 or equivalent. Laboratory fee, \$35. (Fall)
- 4 **Language and Culture** (3) Coffland and Staff  
Fourth-semester language study. History, geography, and culture of Italy, with emphasis on conversation and composition. Prerequisite: Ital 3 or equivalent. Laboratory fee, \$35 per semester. (Spring)
- 9 **Contemporary Institutions** (3) Ferretti  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Material fee: \$35. Prerequisite: Ital 4.
- 10 **Press, Communication, and Politics** (3) Ferretti  
Sixth-semester language study, utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Italy. Material fee, \$35. Prerequisite: Ital 9.
- 51-52 **Survey of Italian Literature** (3-3) Ferretti  
Readings in Italian literature from the Middle Ages to the present. Lectures, reports, and informal discussions. (Academic year)

## PORTUGUESE

- 1 **Introductory Portuguese I** (4) Frankie  
First-semester Portuguese. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$35. (Fall)
- 2 **Introductory Portuguese II** (4) Frankie  
Second-semester Portuguese. Emphasis on communication, composition, and reading. Prerequisite: Port 1 or equivalent. Laboratory fee, \$35. (Spring)
- 3 **Intermediate Portuguese** (4) Frankie  
Third-semester Portuguese. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Port 2 or equivalent. Laboratory fee, \$35. (Fall)
- 4 **Language and Culture** (3) Frankie  
Fourth-semester language study. History, geography, and culture of Brazil, with emphasis on conversation and composition. Prerequisite: Port 3 or equivalent. Laboratory fee, \$35. (Spring)
- 9 **Contemporary Institutions** (3) Frankie  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis



oral presentation, stressing communicative skills. Material fee: \$35. Prerequisite: Port 4. (Fall)

**10 Press, Communication, and Politics (3)**

Franklin

Sixth-semester language study, utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Brazil and Portugal. Material fee, \$35. Prerequisite: Port 9. (Spring)

**ROMANIAN**

**49-50 Readings in Romanian (3-3)**

Verona

An introductory course that stresses the basic grammar of Romanian and concentrates on the development of reading skills. Knowledge of another Romance language is useful. (Offered as the demand warrants)

**SPANISH**

**Departmental prerequisite:** Span 4 or equivalent is prerequisite to all courses in Spanish, from Span 8 and above.

**1 Introductory Spanish I (4)**

Staff

First-semester Spanish. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$35. (Fall, spring, and summer)

**2 Introductory Spanish II (4)**

Staff

Second-semester Spanish. Emphasis on communication, composition, and reading. Prerequisite: Span 1 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

**3 Intermediate Spanish (4)**

Staff

Third-semester Spanish. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Span 2 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

**4 Language and Culture (3)**

Konz and Staff

Fourth-semester language study. History, geography, and culture of Spain, with emphasis on conversation and composition. Prerequisite: Span 3 or equivalent. Laboratory fee, \$35. (Fall, spring, and summer)

**6 The Language of Business, Commerce, and Management (3)**

Staff

Fifth-semester language study; refining of general linguistic competence; introduction to the economic life of Latin America and Spain, the language of business and finance. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Span 4 or equivalent. Students who receive credit for Span 8 cannot receive credit for Span 9. Material fee, \$35. (Fall)

**9 Contemporary Institutions (3)**

Ament and Staff

Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Material fee \$35. Prerequisite: Span 4. Students who receive credit for Span 9 cannot receive credit for Span 8. (Fall, spring, and summer)

**10 Press, Communication, and Politics (3)**

Ament and Staff

Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Spain and Spanish America. Material fee, \$35. Prerequisite: Span 8 or 9. (Fall, spring, and summer)

**20 Spanish Pronunciation (3)**

Staff

The sounds of Spanish. Oral readings, presentations, recitation. Poetry, scenes from plays. Emphasis on phonetics and diction, with attention to accent, rhythm, and intonation. Prerequisite: Span 10. Laboratory fee, \$35. (Spring)

**30 General Readings in Spanish Literature (3)**

Azar and Staff

Readings in prose, poetry, and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Span 10. (Fall and spring)

**49 Spanish for Graduate Students (0)**

Savin

For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours. (Fall and spring)

- 53 History of Spanish Literature from the Middle Ages** Vergara  
**Through the Siglo de Oro (3)**  
 Lecture and discussion in Spanish. Development of genre and movements. Selected readings across the period plus the reading of complete texts of epics, essays, novels, and drama. Prerequisite: Span 30 or equivalent. (Fall)
- 54 History of Spanish Literature from the 18th** Vergara  
**Through the 20th Century (3)**  
 Lecture and discussion in Spanish. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Span 30 or equivalent. (Spring)
- 55 History of Spanish-American Literature from the** Quiroga  
**Conquest Through Romanticism (3)**  
 Lecture and discussion in Spanish. A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Fall)
- 56 History of Spanish-American Literature from** Quiroga  
**Modernism to the Present (3)**  
 A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Spring)
- 90 Textual Analysis (3)** Captain-Hidalgo  
 Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. Prerequisite: Span 30 or equivalent. (Spring)
- 108 Advanced Spanish Grammar and Style (3)** Quiroga, Valero  
 Composition, drills, dictations. Translations into Spanish. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Span 10. (Fall)
- 109 Contemporary Spain and Latin America (3)** Quiroga, Vergara  
 Emphasis on advanced oral work. Discussion of Hispanic culture and civilization, based on contemporary writings and video documents. Material fee, \$35. Prerequisite: Span 10. (Fall)
- 110 Business and Commercial Spanish (3)** Staff  
 Structure and language of Latin American and Spanish economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Prerequisite: Span 10. (Spring)
- 120 Studies in Medieval Spanish Literature (3)** Azar  
 Reading and analysis of the major literary texts from the 11th through the 15th century. Attention paid to linguistic aspects of Old Spanish.
- 121 Studies in Golden Age Literature (3)** Azar  
 Reading and analysis of the major texts of the 16th and 17th centuries. Life, poetry and the "invention" of subjectivity. Prose fiction and the structure of the Golden Age Comedia and the relation between private and public life. Humanism and the Classical Tradition. The invention of the press, the status of writers and the new culture of the book. The (post)modernity of Golden Age literature.
- 122-23 Cervantes' Don Quijote and the Rise of the Novel (3)** Valero, Vergara  
 The novel as a genre. Literature as an institution: Western literary tradition constructed and deconstructed. The structure of narrative and the question of truth. Literature and life. (Academic year)
- 124 18th- and 19th-Century Spanish Literature (3)** Vergara  
 Readings in major 18th and 19th century texts. Romanticism, Costumbrismo, realism, naturalism.
- 125 Contemporary Spanish Literature (3)** Staff  
 Prose, poetry, and drama of the 20th century; Generations of 1898, of 1927, the novel after the Spanish Civil War.
- 130 Theory of Poetic Discourse (3)** Quiroga  
 Major classical and modern poetic traditions and genres. Textual analysis of major Spanish works. (Fall)
- 131 Theory of Narrative Discourse (3)** Staff  
 Emphasis on the novel and short story. (Spring)
- 132 Theory of Drama (3)** Azar, Valero  
 Study of major dramatic traditions in Spain. Emphasis on the comedia.
- 133-34 Special Topics in Spanish Literature (3-3)** Saenz, Valero  
 May be repeated for credit provided the topic differs. Fall 1991: 20th-century drama. Spring 1992: The Spanish and Spanish-American essay.



- 145 Modern Spanish-American Poetry (3)** Quiroga, Valero  
Poetry after Modernism; the various metric patterns that characterize the work of authors such as Agustini, Mistral, Huidobro, Villaurrutia, Vallejo, Borges, Neruda, Parra, Cardenal, Guillen, Lezama, and Pales. (Spring)
- 146 Short Fiction (3)** Valero, Captain-Hidalgo  
Analysis of short stories and short novels by writers such as Quiroga, Rulfo, Fuentes, Cortázar, Zapata Olivolla, and Arenas
- 147 Spanish-American Polemics (3)** Quiroga, Captain-Hidalgo  
Origin and development of writing in Spanish America and its relationship to the creation of national or nationalist discourse. Readings include excerpts concerning the New World and its inhabitants, the question of independence (cultural and economic), and the discourse for and against slavery. The focus is on the 19th century and the essay.
- 148 New Narrative (3)** Valero, Captain-Hidalgo  
A study of experimental fiction in Spanish America, with a focus on the literature of the mid-1960s through the 1970s. Precursors of and successors to the new narrative. (Fall)
- 149 Colonial Literature (3)** Quiroga, Captain-Hidalgo  
Focus on the literature written before independence, with an incursion into Spanish Medieval and Renaissance literature.
- 150 Romanticism and Modernism (3)** Quiroga, Vergara  
Key writers and trends that characterize Romanticism and Modernism. Readings include works from the period of the French and American Revolutions: Andrés, Sarmiento, Olmedo, Heredia, Darío, Martí, and Lugones.
- 199-200 Proseminar (3-3)** Staff  
Required of all majors; preparation for the major field examination. Conferences, group discussion, practicum: literature in relation to the other arts and the social sciences. Span 199: textual analysis, literary criticism, theory, and methods. Span 200: the concepts of literary history and the history of Spanish literature: periods, authors, genres, topics. (Academic year)

### SERVICE-LEARNING PROGRAM

- 152 Issues in Education and Human Services (3 or 6)** Nashman  
Exploration of the effects of education on society and vice versa; opportunities for experience, study, and service (16-20 hours per week) in public, private, museum, hospital, and community education centers. Admission by permission of instructor. (Fall and spring)
- 154 Independent Study (1 to 6)** McAleavey and Staff  
Field work combined with academic study, involving field placements and complementary academic program of study, under the supervision of an appropriate faculty member. Students must contract with the agency, the faculty member, and the Service-Learning Program. Admission by permission of director. (Fall and spring)

### 700 SERIES

The 700 Series is made up of experimental or special courses that are on the cutting edge of the academic endeavor. Often, courses in the 700 Series focus on interdisciplinary or very current issues in a field. Because 700 Series courses change each semester, students should consult the Schedule of Classes for offerings. Courses are listed with the participating departments; course descriptions appear in a specially designated section of the schedule.

Courses numbered 701 are in general studies, 721 courses are interdepartmental, 751 courses are interschool, and 770s are taught by University Professors and are listed in this bulletin under the designation of University Professors. The program is coordinated by the Special Assistant to the Vice President for Academic Affairs.

## SLAVIC LANGUAGES AND LITERATURES

Professors C.A. Moser, N.N. Natov (Emeritus)

Associate Professors Y. Olkhovsky, I. Thompson (Chair)

Associate Professorial Lecturer S. Ficks

Assistant Professors M.F. Miller, R.M. Robin

Bachelor of Arts with a major in Russian language and literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite courses—Slav 5–6 (preferred), or Slav 1–2, 3–4; or equivalent; and Slav 91–92.
3. Required for the major: 42 credit hours of course work in the Department of Slavic Languages and Literatures distributed as follows: language—18 hours (Slav 11–12 and 109–110), culture—6 hours (Slav 161–162); literature in Russian—6 hours chosen from Slav 171, 172, 173, 174, literature in English translation—6 hours chosen from 100-level courses (Slav 166 must be included); Slav 199–200.

A student who is already proficient in Russian language or literature may, upon passing an appropriate examination, waive any or all of the language or literature courses below the 100 level, as well as up to 6 credit hours of 100-level courses.

Minor in Russian language and literature—Slav 1–2 and 3–4 or 5–6; 9–10; Slav 91–92, 165, 166.

**Placement Examination:** A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

#### 1–2 First-Year Russian (3–3)

First part of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Slav 1 is prerequisite to Slav 2. Laboratory fee, \$35 per semester. (Academic year)

#### 3–4 Second-Year Russian (3–3)

Second half of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 3: Slav 1–2 or equivalent. Prerequisite to Slav 4: Slav 3. Laboratory fee, \$35 per semester. (Academic year)

#### 5–6 Intensive Beginning Russian (6–6)

Beginning intensive course in fundamentals of speaking, understanding, reading, and writing Russian (equivalent to Slav 1–2 and 3–4). Prerequisite to Slav 7: Slav 2 or 5 or equivalent. Laboratory fee, \$35 per semester. (Academic year)

#### 9–10 Third-Year Russian (3–3)

Practice in speaking, listening, reading, and writing at the intermediate level. Prerequisite: Slav 4, 6, or permission of instructor. (Academic year)

#### 11–12 Intensive Intermediate Russian (6–6)

Intermediate intensive course in speaking, understanding, reading, and writing Russian. Compared to Slav 9–10, includes additional practice in language skills. Prerequisite: Slav 4, 6, or permission of instructor. Recommended for majors. (Academic year)

#### 21–22 Elementary Czech (3–3)

Beginning course in fundamentals of speaking, understanding, reading, and writing Czech. Prerequisite to Slav 22: Slav 21 or equivalent. Laboratory fee, \$35 per semester. (Offered when the demand warrants)

#### 31–32 Elementary Polish (3–3)

Beginning course in fundamentals of speaking, understanding, reading, and writing Polish. Prerequisite to Slav 32: Slav 31 or equivalent. Laboratory fee, \$35 per semester. (Offered when the demand warrants)

#### 41–42 Elementary Serbo-Croatian (3–3)

Beginning course in fundamentals of speaking, understanding, reading, and writing Serbo-Croatian. Prerequisite to Slav 42: Slav 41 or equivalent. Laboratory fee, \$35 per semester. (Offered when the demand warrants)



- 51-52 **Elementary Bulgarian (3-3)** Moser  
Beginning course in fundamentals of speaking, understanding, reading, and writing Bulgarian. Prerequisite to Slav 52: Slav 51 or equivalent. Laboratory fee, \$35 per semester. (Offered when the demand warrants)
- 71 **Soviet Civilization (3)** Olkhovsky  
Survey of the Soviet Union's past and present development. Lectures, discussion, visual aids—in English. (Spring)
- 91-92 **Introduction to Russian Literature (3-3)** Moser  
Emergence and development of Russian literature and ideas during the 19th and early 20th centuries—in English. (Academic year)
- 101-2 **Readings in the Soviet Press (3-3)** Ficks  
Representative reading and translation of Soviet periodicals and current publications in social sciences. Prerequisite: Slav 4 or 6 or permission of instructor.
- 109-10 **Fourth-Year Russian (3-3)** Thompson  
Practice in speaking, listening, reading, and writing at the advanced level. Prerequisite: Slav 12 or permission of instructor. (Academic year)
- 126 **Leo Tolstoy: His Life and Works (3)** Staff  
Evolution of Tolstoy's artistic and philosophical ideas. Tolstoy's impact on Russian literature and society. Lectures, reports, and classroom analysis of his major works—in English.
- 128 **Dostoevsky: The Man and the Artist (3)** Staff  
Sources and development of Dostoevsky's philosophical, religious, and aesthetic ideas. His influence on Russian and western literature. Lectures, discussions, and reports—in English.
- 143-144 **The Russian Novel (3-3)** Moser  
Study of representative novels of the 19th and 20th centuries—in English.
- 161-62 **Russian Culture (3-3)** Olkhovsky  
Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lectures, discussion, reports. (Academic year)
- 165 **Modern Russian Literature from the Revolution to World War II (3)** Staff  
Basic themes, trends, and literary figures of the 1920s and 1930s. The impact of the revolution and civil war on writers and literature. Lectures, discussions, reports—in English.
- 166 **Modern Russian Literature from World War II to the Present (3)** Staff  
Literature in wartime and in postwar years. The "thaws," new generation of writers, and new trends in literature of the 1960s, 1970s, and 1980s. Lectures, discussions, reports—in English.
- 171 **Readings in 19th-Century Russian Prose (3)** Moser  
Reading of representative prose texts of the 19th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 91-92.
- 172 **Readings in 19th-Century Russian Poetry (3)** Moser  
Reading of representative poetry of the 19th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 91-92.
- 173 **Readings in 20th-Century Prose (3)** Moser  
Reading and discussion of representative prose of the 20th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 165, 166.
- 174 **Readings in 20th-Century Poetry (3)** Moser  
Reading of representative poetry of the 20th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 165, 166.
- 199-200 **Proseminar: Readings for the Major (3-3)** Moser, Thompson  
Review and analysis of language and literature. (Academic year)

## SOCILOGY

University Professor A. Etzioni  
Professors R.W. Stephens, R.G. Brown (Chair), T.F. Courtless, Jr., P.H.M. Lengermann,  
R.A. Wallace, P. Langton, W.J. Chambliss  
Adjunct Professor S.J. Rogers  
Associate Professors J.L. Tropea, S.A. Tuch  
Assistant Professor R. Weitzer

**Bachelor of Arts with a major in sociology**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite course—Soc 1.
3. Required courses in related areas—12 credit hours in one of the following related social science fields: anthropology, economics, geography, history, political science, or psychology
4. Required courses in the major—Soc 103, 140–41, 191, and 15 additional credit hours in 100-level sociology courses

**Bachelor of Arts with a major in criminal justice**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences
2. Prerequisite course—Soc 1.
3. Required courses in related areas—Anth 154, Phil 142, PSc 115, and Psyc 154.
4. Required courses in the major—Soc 135, 136, 137, 139, 192, plus three additional 100-level sociology courses.

**Minor in sociology**—A minimum of 15 hours of course work, including Soc 1 and 103 or 140, plus 9 hours of electives in courses at the 100 level or higher. Departmental advising is required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** Soc 1 is prerequisite to all sociology courses except Soc 1 and 181.

- 1 **Introduction to Sociology** (3) Stat  
A broad overview of the "sociological imagination" as a way of understanding social events and personal experience, sociology's place among the social sciences, basic elements of sociological perspectives. (Fall and spring)
- 2 **Studying Society** (3) Stat  
Basic sociological knowledge about contemporary American society; a general and critical introduction to quantitative and qualitative research methods used by sociologists to study major societal issues. (Fall and spring)
- 3 **Introduction to Criminal Justice** (3) Chambliss, Courtless, Tropea, Weitzer  
An introduction to the study of criminal justice. The historical development of criminal justice and its evolution into modern legal systems. The impact of different forms of criminal justice on society and the individual. (Fall and spring)
- 103 **Major Sociological Perspectives** (3) Lengermann, Waller  
An examination of the development and contemporary content of the major theoretical perspectives guiding sociological work. Theories include functionalism, exchange theory, critical theory, conflict theory, symbolic interactionism, and phenomenology. (Fall and spring)
- 120 **Sociology and Public Policy** (3) Stat  
Introduction to concepts, theory, and research illustrating the application of the sociological perspective to public policy.
- 122 **Death and Dying: A Sociological Perspective** (3) Brown, Langton  
Processes of death and dying examined from the perspectives of dying persons, their families and professionals. Death as a social institution and various social issues surrounding death, such as suicide, euthanasia, capital punishment, and death-related social movements, are analyzed. (Spring)
- 124 **Sociology of Health Care** (3) Langton, Brown  
Social factors and processes related to the etiology and treatment of physical and mental illness, medical occupations and professions, medical organizations, and problems of delivery of health care services. (Fall)
- 125 **Sociology of Religion** (3) Wallace, Miller  
An analysis of the relationships between religion and society. Topics include the emergence of uniquely American religious forms such as civil religion and religious groups. (Fall, odd years)



- 129 **Race and Minority Relations** (3) Stephens, Tuch  
Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. (Spring)
- 130 **Class and Inequality in American Society** (3) Tuch, Brown  
Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; international comparisons; analysis of public policies that affect these distributions. (Fall)
- 132 **The Family in Modern Society** (3) Stephens  
An examination of the stages of family life: birth, childhood, premarital relationships, marriage and sex roles in marriage, retirement and old age. Special emphasis on development and maintenance of interpersonal relations. (Fall)
- 133 **Learning and the Life Cycle** (3) Tropea, Wallace  
Sociological approaches to learning from childhood through adolescence and adulthood. Emphasis on the impact of social institutions and group interaction on the learning process. (Spring)
- 134 **Violence and the Family** (3) Tropea  
Comparative approach to power and violence in family systems. Analysis of devaluation of family relations. Critical survey of explanations of violence and responses made to it. (Fall)
- 135 **Youth and Delinquency** (3) Chambliss, Courtless, Tropea  
A criminal justice course. Analysis of historical, economic, and social conditions affecting both difficulties in socializing youth and the evolution of the state's formal systems of control. (Spring)
- 136 **Criminology** (3) Chambliss, Tropea, Courtless  
A criminal justice course. Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society. Analysis of the historical, social, legal, and cultural conditions affecting the nature of crime, criminality, and the development of state responses made to it. (Fall)
- 137 **Sociology of Law** (3) Chambliss, Courtless, Tropea, Weitzer  
A criminal justice course. Law as a social phenomenon and agency of social control. Special emphasis is placed on study of the sources of and challenges to the legitimacy of law. (Fall)
- 138 **Alcohol, Alcoholism, and Society** (3) Langton  
An overview of alcohol use and abuse in American society; impact on work, family, and crime; policies and legislation for social control of problem drinking and alcoholism. (Fall and spring)
- 139 **Deviance and Control** (3) Chambliss, Tropea, Courtless, Weitzer  
A criminal justice course. Analysis of the creation of deviance through collective definitions and responses. Development of a perspective on processes of becoming deviant. (Spring)
- 140 **Social Research Methods** (3) Tuch  
Introduction to basic research methods in sociology. Topics include research design, sampling, measurement, and elementary data analysis via computer application. (Fall)
- 141 **Techniques of Data Analysis** (3) Tuch  
Continuation of Soc 140. Examination of a range of topics in the statistical analysis of sociological data, with a strong emphasis on computer applications. Prerequisite: Soc 140. (Spring)
- 143 **Social Movements** (3) Stephens  
General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. (Spring)
- 144 **Sociology of Terror** (3) Courtless, Chambliss  
Examination of contemporary terrorism, using historical and sociological perspectives. The state and terrorism (the state as terrorist, state-supported terrorism, and the limitations and possibilities of state response to the threat of terrorism). (Spring)
- 152 **Field Experience in Sociology** (9) Staff  
Development of a comprehensive perspective and applied skills in selected social systems through seminars, readings, research, and field placement. Re-

- quires 16 hours of field work weekly. Recommended for juniors and seniors. Open to all but majors in criminal justice. Topics include health, aging, and family. (Fall or spring)
- 155 **Sociology of Sex and Gender** (3) Wallace, Lengermand  
The roles of women and men from social structural and social psychological perspectives. Analysis of gender inequality in such areas as the family, the workforce, the media, politics, law, religion, and education. (Fall)
- 181 **Special Topics in Sociology** (3) Staff  
Analysis and examination of various processes in society of general importance to the field of sociology, e.g., social conflict, socialization, social change. Topics change each semester; may be repeated for credit. Admission by permission of instructor. (Fall)
- 191 **Senior Seminar** (3) Staff  
A final review of the field for sociology majors nearing graduation. The course emphasizes the integration of theory and research, critical reflection and evaluation, and recent developments in sociology. Required for all sociology majors. Prerequisites: Soc 103, 140, and 141. (Fall and Spring)
- 192 **Advanced Seminar and Fieldwork in Criminal Justice** (9) Chambliss, Courtless Tropen, Weitzer  
Review of the field of criminal justice for majors nearing graduation. Field experiences; recent developments, research, and practices. Sixteen hours of fieldwork and four hours of seminar attendance required weekly. Admission by permission of advisor. (Fall, spring, and summer)
- 195 **Research** (1, 2, or 3) Staff  
Independent study and special projects. Open only to selected undergraduate students with promising academic records. Before students are permitted to register for Soc 195, they must submit a written proposal of their plan of study to the approval of the staff member of the department who will be directing the research. (Fall and spring)

## SPANISH

See Romance Languages and Literatures.

## SPECIAL EDUCATION

See Teacher Preparation and Special Education.

## SPEECH AND HEARING

Professors J.W. Hillis, L.S. Bowling, C.W. Linebaugh (Chair)  
Associate Professors M.D.M. Brewer, J.R. Regnell, W.P. Cupples  
Associate Professorial Lecturer A.M. Schmidt

**Bachelor of Arts with a major in speech and hearing science**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in related areas—Comm 1, Psyc 121 and 131 (or their equivalents) plus 15 additional credit hours of 100-level courses selected from related areas as approved by the major advisor.
3. Required courses in the major—SpHr 11, 101, 102, 103, 104, 108, 118, 119, 120.

**Minor in speech and hearing**—15 credit hours are required, including SpHr 11, 101, 102, and at least 6 credit hours of 100-level courses to be selected from SpHr 102, 104, 108, 118, 119, and 120.

With permission, a limited number of graduate courses in the department may be used for credit toward an undergraduate degree. See the Graduate Programs Bulletin for listings.

Speech and hearing therapy: See the Speech and Hearing Center

### 11 Voice and Diction (3)

Development of naturalness, correctness, and clarity in conversation through study of phonetics, rate, volume, pitch, and quality in preparation for performance. Laboratory fee, \$10. (Fall, spring, and summer)



- 71 Foundations of Human Communication (3)** Linebaugh  
An introduction to the fundamental principles of the biology of speech, hearing and language, language structure and use, and human communicative interaction. Practice in the identification of specific verbal and nonverbal aspects of communication behavior. (Fall)
- 101 Hearing Science (3)** Brewer  
Anatomy and physiology of the auditory mechanism, basic acoustics and psychoacoustics. Theories of hearing and frequency and intensity perception. Laboratory fee, \$20. (Fall)
- 102 Neural Substrates of Speech, Hearing, and Language (3)** Linebaugh  
Neuroanatomy and neurophysiology as they relate to speech, hearing, and language. Emphasis on sensory and motor systems and neuroanatomical correlates of language processing; neurolinguistics. Laboratory fee, \$20. (Spring)
- 103 Speech Science (3)** Linebaugh  
Functions of the respiratory, laryngeal, and orofacial structures in normal speech production, physiological and acoustic phonetics. Laboratory fee, \$20. (Fall)
- 104 Speech and Language Disorders (3)** Regnell  
Survey of the nature and causes of developmental and acquired disorders of speech and language. Emphasis on prevention and effective communication with persons having a speech-language impairment. (Spring)
- 108 Introduction to Audiology (3)** Brewer  
Survey of the field of audiology, including the measurement of hearing, the nature and causes of hearing impairment, hearing aids and habilitation rehabilitation of the hearing impaired. Prerequisite: SpHr 101. Laboratory fee, \$20. (Spring)
- 118 Structure and Analysis of Speech and Language (3)** Schmidt  
Semantic, morphologic, syntactic, phonologic, and pragmatic aspects of language. Methods for the analysis of speech and language, including practice in phonetic phonemic transcription. Laboratory fee, \$15. (Fall)
- 119 Experimental Analysis of Communication Behavior (3)** Hillis  
Assessment of speaker-listener behavior, acoustic, behavioral, and linguistic properties of speaker intelligibility and credibility; behavioral observation and computer technology in measurement and modification of speaker-listener attributes. (For laboratory credit, register for 1 hour of SpHr 196.) Prerequisite: Comm 1 or SpHr 11. Laboratory fee, \$20. (Fall)
- 120 Speech and Language Development (3)** Staff  
Development of speech, language, and auditory and related cognitive processes. Application of analytic methods to developmental and cultural variations in speech and language. Prerequisite: SpHr 118 or equivalent. (Spring)
- 196 Independent Study (1 to 6)** Staff  
Independent research and special projects. Before students are permitted to register for SpHr 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will direct the study and of the department chair.

## STATISTICS/COMPUTER AND INFORMATION SYSTEMS

Professors H.W. Lilliefors, A.D. Kirsch (Chair), J.L. Gastwirth, S.W. Greenhouse (Emeritus), N.D. Singpurwalla, R.T. Smythe, J.M. Lachin III, K.K.G. Lan  
Professorial Lecturers J. Kullback, F. Ponti  
Associate Professors R.E. Thomas, P.F. Thall, S.E.F. Schlesselman (Research), H.M. Mahmoud, T.K. Nayak, R.P. Bain (Research)  
Associate Professorial Lecturers R. Jacob, R.F. Teitel, J.S. Wu  
Assistant Professors D.A. Grier, R.G. Epstein, B. Toman, C.B. Hurley

Bachelor of Arts or Bachelor of Science with a major in statistics, statistics with an option in computer science, or computer and information systems—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses for all majors—Math 31, 32, 33, Stat 91 (except computer and information systems majors).
3. Required courses for all majors—Math 124; Stat 129, 130.

4. (a) Required courses for the statistics major—Stat 110, 119, 157–58, 189, plus three approved 100-level courses in statistics.

(b) Required courses for the statistics major with an option in computer science—Stat 110, 119, 131, 157–58, plus three approved 100-level computer related courses. Math 105 is recommended.

(c) Required courses for the computer and information systems major—Stat 131, 132, 133, 134, 135, 142, 157–58 or 189–90, plus two approved courses from Stat 145, 146, 147, 148, 149, 150. Math 105 is recommended.

5. Students interested in eventually pursuing a Ph.D. program in statistics are advised to take Stat 190, Math 139 and 140, and two years of a foreign language. Math 157 is also recommended.

6. To assure a balanced program, departmental approval of electives is required for all majors.

Students who seek Special Honors in statistics should check with the Department

**Minor in statistics**—18 hours of approved courses in this department, including an introductory statistics course, Stat 118, and one computer course.

**Minor in computer and information systems**—18 hours of approved courses in this department, including Stat 129, 130, and 131, and two additional computer courses selected with approval of advisor as well as one course in statistical methods. One year of calculus is recommended.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Stat 51, 53, 91, 104, 111, and 127 are related in their subject matter, and credit for only one of the six may be applied toward a degree. One entrance unit in algebra is prerequisite to all courses in statistics.

**51 Introduction to Business and Economic Statistics (3)**

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, probability distributions, sampling, estimation, tests of hypotheses, regression and correlation. (Fall and spring)

**53 Introduction to Statistics in Social Science (3)**

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, regression and correlation. (Fall and spring)

**91 Principles of Statistical Methods (3)**

Probability, frequency distributions and their characteristics, descriptive measures, estimation, tests of hypotheses, regression and correlation. Primarily for students in the natural sciences. (Fall)

**103 Sampling in Accounting (3)**

Special emphasis on applications of sampling techniques and design to accounting problems. Prerequisite: Stat 51, 53, 91, or equivalent. (Fall and spring)

**104 Statistics in Management, Administration, and Policy Studies (3)**

Lecture (3 hours), laboratory (1 hour). Introductory study of statistical techniques for research problems. For graduate students in fields other than statistics who have no previous statistics training. Offered off campus only.

**105 Statistics in the Behavioral Sciences (3)**

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, nonparametric techniques, sampling theory. Prerequisite: Stat 53, 104, or equivalent and satisfactory performance on a placement examination. (Fall and spring)

**111 Business and Economic Statistics I (3)**

Descriptive statistics, graphical methods, probability, special distributions, random variables, sampling, correlation, estimation and confidence intervals, hypothesis testing. (Fall)

**112 Business and Economics Statistics II (3)**

Continuation of Stat 111, with emphasis on techniques of regression, chi-square, sampling designs, index numbers, and other topics used in economics and business. Prerequisite: Stat 111 or equivalent. (Spring)



- 118 Regression Analysis** (3) Hurlev, Lilliefors  
Lecture (3 hours), laboratory (1 hour). Simple and multiple linear regression, partial correlation, residual analysis, stepwise model building, multicollinearity and diagnostic methods, indicator variables. Prerequisite: 3 credit hours selected from Stat 51, 53, 91, 104, 127. (Fall and spring)
- 119 Analysis of Variance** (3) Staff  
Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; randomized block, factorial, Latin square designs, and analysis of covariance. Prerequisite: Stat 118. (Spring)
- 121 Introduction to Categorical Data Analysis** (3) Lachin, Lan, Thall  
Sampling models for contingency tables; measures and tests of association; sample size and power evaluation in matched and unmatched studies; Mantel-Haenszel procedure and its generalizations; modeling in cross-classifications; GSK method and ML approach; logistic regression. (Spring, even years)
- 123 Introduction to Econometrics** (3) Staff  
Same as Econ 123.
- 127 Statistics for the Biological Sciences** (3) Staff  
Introduction to statistical techniques and reasoning applicable to the biomedical and related sciences. Properties of basic probability functions: binomial, Poisson, and normal. Data analysis, inference, and experimental design. (Fall and spring)
- 129 Introduction to Computing** (3) Staff  
Computer and programming concepts; algorithm development. Emphasis on careful construction and implementation of programs using structured programming techniques and a high-level language. (Fall and spring)
- 130 Computer Programming** (3) Thomas and Staff  
Development of advanced computing ideas: records, recursion, sets, pointer variables and dynamic storage. Introduction to data structures: stacks, queues, linked lists, and binary search trees. Prerequisite: Stat 129 or equivalent. (Fall and spring)
- 131 Data Structures and Algorithms** (3) Thomas  
Analysis of algorithms. Abstract data types. Development and application of advanced data structures: priority queues, multilinked lists, sparse matrices, B-trees, tree balancing, and graphs. Sorting and searching algorithms. Prerequisite: Stat 130 or equivalent. (Fall and spring)
- 132 Introduction to Discrete Structures** (3) Mahmoud  
Joint offering of the Statistics and Mathematics Departments. Discrete structures and associated mathematical tools. Topics include sets, functions, relations, directed and undirected graphs, propositional calculus, Boolean algebras, with applications to computer science. Prerequisite: Stat 130 and Math 31. (Fall)
- 133 Computer Organization and Assembly Language** (3) Jacob  
Data representation and arithmetic; computer structure and machine language; computer architecture. Assembly language: addressing techniques; file input and output. Study of an actual small computer. Prerequisite: Stat 130. (Fall)
- 134 Operating Systems** (3) Jacob  
Techniques for handling simultaneous processes; dynamic procedure activation; synchronization and mutual exclusion; semaphores. Operating system design methodologies; abstract data types; monitors; kernels. Memory management; memory hierarchy; paging. Recovery procedures. Prerequisite: Stat 133. (Spring)
- 135 Survey of Programming Languages** (3) Staff  
Structured and nonstructured languages; list-structured languages; pattern matching and symbol manipulation languages; interpretive and interactive languages; variable binding. Prerequisite: Stat 131. (Spring)
- 142 Introduction to Automata Theory** (3) Mahmoud  
Finite state automata. Turing machines and computability; universal Turing machine, computable and noncomputable functions; halting problem; computational complexity. Formal grammars and their relationship to automata. Prerequisite: Stat 130 and Math Stat 132. (Spring)
- 145 Compiler Design** (3) Staff  
Grammars, languages, syntax, and semantics. Lexical analysis; symbol tables; context-free language parsing techniques, code generation. Prerequisite: Stat 131 (Spring)

- 146 Design and Development of Software (3)** Epstein  
Design techniques; structured programming; code reading; stepwise refinement; top-down design; information hiding; coupling and cohesion. Development of a multicomponent software project by students. Prerequisite: Stat 131. (Fall)
- 147 Artificial Intelligence (3)** Staff  
Representation of knowledge, notational systems such as logics, programming languages, trees, and networks; LISP. Search strategies; heuristics; production rule systems. Algorithms used in AI; natural language processing, vision, manipulator operation, theorem proving, problem solving. Prerequisite: Stat 131. (Fall)
- 148 Database Systems (3)** Epstein  
Sequential file processing; random access storage. Hierarchical, network, and relational data models. Data normalization; data description languages; query facilities. File and index organization; inverted files. Data integrity and reliability; computer security. Prerequisite: Stat 130. (Spring)
- 149 Simulation and Modeling (3)** Grier, Hurler  
Discrete simulation of real-world systems. Simulation techniques and languages; queues; event-driven simulation systems. Analysis of algorithms; prediction of system performance; queuing theory. Prerequisite: Stat 130; some statistics. (Spring)
- 150 Senior Seminar (3)** Staff  
Advanced topics in computer science. Faculty present examples of current research work in computer science. Students work individually with a faculty advisor. Prerequisite: Senior standing or permission of department.
- 157-58 Introduction to Mathematical Statistics (3-3)** Staff  
Distribution theory, sampling theory, estimation, hypothesis testing, regression analysis, experimental design. Prerequisite: Math 31 and 32 or equivalent. (Academic year)
- 181 Applied Time Series Analysis (3)** Wh  
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate time series. Estimation of spectral density functions, white noise tests, and tests for periodicities. Theory and applications using SAS on the CW computer. Prerequisite: Math 33, Stat 157-58 or 118. (Fall)
- 183 Intermediate Statistical Laboratory:** Grier, Toman, Hurler  
**Statistical Computing Packages (3)**  
Application of program packages (e.g., SAS, SPSS, Biomed) to the solution of multivariate statistical problems. Basic concepts in data file preparation, manipulation, analytical techniques, and interpretation of results. Prerequisite: introductory statistics course. (Fall and spring)
- 185 Computer Performance Modeling (3)** Grier, Mahmax  
Mathematical tools for modeling and predicting the speed and utilization of computer systems, including deterministic, stochastic, and computer simulation models. Queuing models, Poisson processes, birth-death processes, and response surfaces. Prerequisite: Stat 131 or 157 or equivalent. (Spring)
- 187 Introduction to Sampling (3)** Staff  
Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall)
- 188 Nonparametric Statistical Inference (3)** Staff  
Statistical inference when the form of the underlying distribution is not fully specified. Nonparametric procedures for estimation and testing hypotheses; introduction to robust procedures. Prerequisite: Stat 91 or equivalent. (Spring, odd years)
- 189-90 Mathematical Probability and Applications (3-3)** Staff  
Combinatorial analysis, conditional probability, stochastic independence, probability distributions, random variables, laws of large numbers. Prerequisite: differential and integral calculus. (Alternate academic years)
- 195 Reading and Research in Statistics (arr.)** Staff  
May be repeated once for credit. Admission by permission of department chair. (Fall and spring)
- 198 Special Topics (3)** Staff  
Topic to be announced in the Schedule of Classes. May be repeated for credit provided the content differs.



**STRATEGIC MANAGEMENT AND PUBLIC POLICY**

Professor H.J. Davis

Associate Professors D.J. Lenn (Chair), J.B. Thurman, I. Cook, E.J. Englander

Assistant Professors D.R. Kane, C.C. Shepherd, Jr., J.H. Boales III, D.K. Davidson (Visiting), R.M. LeNoir

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration. Please note that the following courses were formerly offered by the Business Administration Department.

- 51 Introduction to Business (3)** Davis, Thurman, Cook, LeNoir  
Structure, activities, and problems of business enterprise; its contribution to the individual and society; careers in business. Prerequisite: Sophomore standing. (Fall and spring)
- 101 The Business Environment (3)** Lenn, Englander, Boales  
Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. Restricted to seniors in the B.B.A. program. (Fall and spring)
- 104 Business and the Legal System (3)** Kane, Shepherd  
General overview of the legal system, role of law, and key legal concepts such as torts and contracts. Specific business applications—antitrust, employer obligations, organization of business enterprise, securities regulation, international law. (Fall and spring)
- 190 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods.
- 191 Fundamentals of Management (3)** Davis, Thurman, Cook, LeNoir  
Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking (Fall and spring)
- 192 Small-Business Management (3)** Holland  
Theory and practice of small-business management. Focus on effective management of small firms, essentials of planning and organizing the firm, financial and administrative controls. Evaluation of alternative business forms: purchase of an ongoing firm, franchising, and new business start-ups. Prerequisite: SMPP 191. (Fall)
- 197 Strategy Formulation and Implementation (3)** Thurman, Cook, Davis, LeNoir  
An integrative capstone course to develop skills in diagnosing organizational problems, formulating and selecting strategic alternatives, and recognizing problems inherent in strategy implementation. Restricted to seniors in the B.B.A. program. May be taken concurrently with MLOM 188. (Fall and spring)
- 199 Individual Research (arr.)**  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

**TEACHER PREPARATION AND SPECIAL EDUCATION**

Professors R.K. Ives, J.R. Shotel, R.N. Ianacone (Chair), G.L. Horrworth, A.J. Mazur, N.J. Belknap, H. Wachs (Research)

Associate Professors L.R. Putnam, L.L. West

Assistant Professors S.S. Beck, L.H. Mauro, N.B. Paley, M. Garza-Lubeck

Adjunct Assistant Professors P. Dupont, W.T. Capps, M. Jarrett, G. Schwartz

Adjunct Instructors M.A. Lucia, M.L. Ortenzo, A.M. Solomon, J.T. Kovack, S.S. Magula

Director of the Reading Center F. Hesser

See the School of Education and Human Development for programs of study leading to the degree of Bachelor of Arts in Education and Human Development.

**TEACHER EDUCATION**

- 50 Introduction to Education and Human Services (3)** Beck  
The scope of education and human services is defined from historical, philosophical, and cross-cultural perspectives. Field trips and group field experience. (Fall and spring)

- 105 Social Issues in Education and Human Services (3)** Paley  
Historical and social development of education and human services; evolution of American education related to the growth of the nation and the changing social order; examination of selected issues in contemporary education and human services
- 110 Elementary School Teaching of Reading (3)** Horrworth  
Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Fieldwork is required. Prerequisite: Educ 104 and TrEd 105 or teaching experience
- 111 Elementary School Curriculum and Methods (2 to 15)** Beck, Paley  
A comprehensive block course with subsections in mathematics, science, language arts, social studies, music, art, and physical education. Pre-student teaching three days a week. Prerequisite: Educ 104, 171, 172; TrEd 105, and senior standing. Material fee: \$10 per subsection. (Fall)
- 118 Elementary Reading: Classroom Diagnosis and Instruction (3)** Putnam  
Emphasis on the interconnections among teaching, learning, and diagnosis within the reading program. Prerequisite: TrEd 110 or equivalent. (Fall)
- 128 Children's Literature (3)** Putnam  
Landmark works in the various genres of children's literature; strategies for integrating literature into the school curriculum. (Spring)
- 132 Student Teaching in Early Childhood Schools (3 or 6)** Beck, Paley  
For seniors. Supervised teaching in selected prekindergarten or kindergarten class in accredited school. seminar. Admission by permission of instructor. Prerequisite: TrEd 111 or equivalent; TrEd 150, 152, 153, 154. (Spring)
- 134 Student Teaching in Secondary Schools (6)** Mauro, Garza-Lubeck  
Admission by permission of instructor. Prerequisite: Methods course in subject area. (Fall and spring)
- 135 Student Teaching in Elementary Schools (6 or 12)** Beck, Paley  
Supervised teaching in an elementary school. Required seminar. Admission by permission of instructor. Prerequisite: TrEd 111 or equivalent. (Spring)
- 150 Foundations of Early Childhood Education (3)** Stat  
Historical development, philosophy, and objectives of nursery schools, kindergartens, and day care; exploration of contemporary programs and models with curriculum implications for schools in the United States and abroad. Admission by permission of instructor. (Fall)
- 152 Early Childhood Curriculum (3)** Stat  
Rationale, development, content approaches, programs, and materials in language arts, mathematics, science, health, social studies, and aesthetic education. Admission by permission of instructor. (Fall)
- 153 Role of the Professional in Early Childhood Education (3)** Stat  
Planning, reporting, records, teacher-child and teacher-family interaction, diagnosis and evaluation, working with paraprofessionals and parents. Emphasis on total classroom ecology. Admission by permission of instructor. (Spring)
- 154 Community Resources and Materials for the Young Child (3)** Stat  
Interaction with community agencies and resources for services; equipment, play activities, curriculum materials, and methods for teaching the infant and young child. Admission by permission of instructor. (Spring)
- 197-98 Research and Independent Study (3-3)** Stat  
Individual or group study or research under the guidance of staff member. Program and conferences arranged with advisor. Admission by permission of advisor. (Academic year)

#### SPECIAL EDUCATION

- 57 Curriculum Development for the Child With Special Needs (3)** Stat  
An overview of theory and scope of pre-academic and academic curriculum development as it relates to the special child. (Fall)
- 58 Curriculum Adaptation for the Child With Special Needs (3)** Stat  
Lectures, demonstrations, and experiences designed to develop the student's ability to adapt curriculum and style of presentation to meet the needs of the special child. Prerequisite: SpEd 57. (Spring)



- 101 Design and Implementation of the Special Education Classroom (3)** Mazur  
Instructional experiences designed to refine the insights and competencies essential for successful teaching in the special education classroom. (Fall)
- 102 Practicum in Teaching the Child With Special Needs: Methods and Materials (3 or 6)** Mazur  
Laboratory course taught in an elementary public school. Students observe and participate in a demonstration seminar conducted by the instructor. Must be taken concurrently with SpEd 189. Material fee, \$50 (Fall)
- 103 Practicum: Teaching the Child With Special Needs: Creative Programming (3 or 6)** Mazur  
Continuation of SpEd 102. Concentration on the total programming of the child with special needs. Must be taken concurrently with SpEd 190. Material fee, \$50. (Spring)
- 160 Academic and Psychosocial Assessment of the Elementary-School-Aged Exceptional Child (3)** Mazur  
An investigation of the assessment process: theory and scope of psycho-educational assessment, informal and formal assessment, clinical experience in informal assessment, application of diagnostic findings to instructional recommendations. Material fee, \$25
- 168 Overview of Handicapping Conditions: Etiology and Symptomatology (3)** Staff  
Causes and symptoms of most prevalent handicapping conditions in children who can be mainstreamed.
- 170 Dynamics of Human Relations: Theory and Practice (3)** Mazur  
Discussion of psychosocial theory as it relates to successful interaction with children. (Fall)
- 189 Preprofessional Internship: Program Adaptation for the Child With Special Needs in the Regular Classroom (3)** Mazur  
Supervised internship in school setting. Emphasis on intensive study of children with special needs. Must be taken concurrently with SpEd 102 (Fall)
- 190 Educational Intervention for the Child With Special Needs: Methods and Materials (3)** Staff  
Observation and participation in various special education settings. Emphasis on exposure to and familiarity with goals and programs of various special education models. Must be taken concurrently with 103 (Spring)
- 197-98 Research and Independent Study (3-3)** Staff  
Individual or group study or research under the guidance of staff members. Admission by permission of advisor. (Academic year)
- 199 Internship in Special Education (6 to 12)** Mazur  
Supervised teaching internship in a school-based intervention program. Student teaching with children identified as needing special education services. A minimum of 240 clock hours required. Admission by permission of the instructor. (Fall)

## THEATRE AND DANCE

Professor M.R. Withers  
Associate Professors N.D. Johnson (Chair), A.G. Wade, N.C. Garner, L.B. Jacobson, W.A. Pucilowsky  
Assistant Professors B.W. Sabelli, C.F. Gudenius, S.C. Haedicke (Visiting)  
Lecturer M.K. Grut

**Bachelor of Arts with a major in theatre**—The following requirements must be fulfilled:  
1. The general requirements stated under Columbian College of Arts and Sciences.  
2. Required courses in related areas—12 credit hours in dramatic literature.  
3. Required courses in the major—TrDa 14, 130, 131, 136, 145-146, 147, 15 additional credit hours in 100-level theatre and dance courses.

**Bachelor of Arts with a major in dance**—The following requirements must be fulfilled:  
1. The general requirements stated under Columbian College of Arts and Sciences.  
2. Required courses in related areas: Mus 3-4.  
3. Required courses in the major (placement in 100-level technique courses is determined by audition): TrDa 130, 131, 160-61, 162-63, 164-65, 170-71, 172-73, 174-75.

180-81, 182-83, 184-85, 186-87, 190-91, 192, 193-94, 199. At the beginning of the senior year, all dance majors undertake a project in a special area of interest under the supervision of one or more faculty members.

**Minor in Theatre**—18 credit hours of theatre courses, including TrDa 145-46.

**Minor in Dance**—6 credit hours from TrDa 160-61, 162-63, 164-65, 170-71, 172-73, 174-75, 192, 193-94, 6 credit hours from TrDa 180-81, 182-83, 184-85; and 6 credit hours from TrDa 186-87, 190-91.

**Minor in Dance Education**—6 credit hours from TrDa 160-61, 162-63, 164-65, 170-71, 172-73, 174-75, 193-94; 6 credit hours from TrDa 180, 182 or 183, 184, 190 or 191; 6 credit hours from TrDa 154, 155, or 156.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Courses below the 100 level are primarily for nonmajors.

#### 14 Introduction to Acting (3)

Basic techniques of concentration, imagination, improvisation, and character development. (Fall and spring) **Garner, Jacobson, Wade**

#### 45 Understanding the Theatre (3)

The art of the theatre; its literature, architecture, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer. Attendance at theatrical performances and presentations by visiting artists. (Fall and spring) **Sabelli**

#### 46 Understanding the Dance (3)

Survey of multiple styles of dance and the relationship of dance to culture and society through the ages. Opportunities to experience dance forms through participation, viewing videotapes and films, and attending theatrical performances. (Fall and spring) **Staff**

#### 50 Beginning Ballet (1)

#### 51 Beginning/Intermediate Ballet (1)

#### 52 Beginning Modern Dance (1)

#### 53 Beginning/Intermediate Modern Dance (1)

#### 54 Beginning Jazz (1)

#### 55 Beginning/Intermediate Jazz (1)

#### 56 Beginning Tap (1)

#### 57 Beginning/Intermediate Tap (1)

#### 58 Beginning Spanish Dance (1)

#### 59 Beginning/Intermediate Spanish Dance (1)

#### 60 Beginning Dance: Ethnic Forms (1)

#### 61 Beginning/Intermediate Dance: Ethnic Forms (1)

#### 62 Beginning Ballroom Dance (1)

#### 63 Beginning/Intermediate Ballroom Dance (1)

#### 64 Beginning Folk Dance (1)

#### 65 Beginning/Intermediate Folk Dance (1)

#### 105 Intermediate Playwriting I (3)

Same as Engl 105.

#### 108 Intermediate Playwriting II (3)

Same as Engl 108.

#### 112 Voice for the Theatre (3)

The practice and application of voice production with reference to skeletal alignment, breathing, resonance, and articulation. Emphasis is placed on the visual awareness of the process of voice production and its application to performance. Prerequisite: SpHr 11 (for theatre majors) or permission of the instructor. (Fall) **Jacobson**

#### 113 Special Problems in Speech for the Actor (3)

Vocal production related to interpretation of specific texts. Focus on stage plays and the interpretation of Shakespeare. Prerequisite: TrDa 112. **Jacobson**

#### 115 Beginning Scene Study (3)

Principles of role development, concentrating on 20th-century material. Prerequisite: TrDa 14. (Fall and spring) **Garner, Jacobson**



- 116 **Scene Study: Modern Comedy** (3) Garner, Jacobson  
Principles of role development, comic timing, and stage business, concentrating on material by contemporary playwrights, such as Neil Simon. Prerequisite: TrDa 115. (Spring, odd years)
- 117 **Audition Techniques** (3) Jacobson, Garner  
All aspects of the audition process: selection and rehearsal of audition monologues, handling of cold reading, etc. Prerequisite: TrDa 115 or equivalent. (Fall, even years)
- 122 **Scene Study: Classical Drama** (3) Garner, Jacobson  
Principles of role development and handling of verse dialogue, concentrating on classical Greek and Shakespearian drama. Prerequisite: TrDa 115. (Fall, odd years)
- 123 **Scene Study: Classical Comedy** (3) Jacobson, Garner  
Principles of role development, concentrating on material from the English Restoration, Molière, and other 17th- and 18th-century playwrights. Prerequisite: TrDa 115. (Spring, even years)
- 130 **Theatre Production** (3) Gudenius  
Theories and practicum in theatre and dance production, including acting or dance, stage management, costume and set construction, rigging, lighting, sound, makeup, business management, and publicity, with specific emphasis in at least one area. May be repeated once for credit. (Fall and spring)
- 131 **Introduction to Lighting** (3) Gudenius  
Lecture (2 hours), laboratory (1 hour). Theories and practicum in lighting for theatre and dance. Laboratory fee, \$15. (Fall)
- 132 **Makeup Design** (3) Pucilowsky  
Theory and practicum in the art of makeup design, including latex and crepe hair. Staff
- 133 **Stage Management** (1) Staff  
Fundamental study of stage management with emphasis on practical production work as well as theory.
- 135 **Introduction to Scene Design** (3) Sabelli  
Fundamental study of scenography, including historic overview, drafting, scene painting, rendering, stage properties, and model construction. (Fall, odd years)
- 136 **Costume History and Construction** (3) Pucilowsky  
History of fashion in Western civilization from ancient Greece to the 20th century. Fundamental study of costume research through specific projects. Costume construction. (Fall)
- 140 **Anthropology, Drama, and the Human Experience** (3) Garner, Allen  
Exploration of the relationships among social interaction, ritual, and dramatic performance. Classes consist of improvisation workshops and discussion, based on readings about non-Western cultures. Same as Anth 191. (Spring)
- 143 **Theatre in Washington** (3) Garner  
An introduction to the organization and operation of professional theatres in Washington. Attendance at production is required. (Summer)
- 145-46 **History of the Theatre** (3-3) Haedicke  
An examination of the development and growth of the theatre from the beginnings to the present. TrDa 145: Ancient Greece through the 17th century. TrDa 146: the 18th, 19th, and 20th centuries. (Academic year)
- 147 **Directing for the Theatre** (3) Garner  
Fundamentals of script analysis, casting, and rehearsal techniques. Prerequisite: TrDa 114, 145, and 146. Laboratory fee, \$15. (Fall)
- 148 **Musical Theatre Production** (3 or 6) Pucilowsky and Staff  
Practicum on all components of a musical theatre production, including principles of design, aesthetics, theory, and historical overview. (Summer)
- 149 **Musical Theatre Performance** (3) Jacobson and Staff  
Intensive training and experience in the performance of musical theatre, culminating in a public performance. Practical staging application in movement, breathing techniques for singing, vocal production, and acting. May be repeated for credit. (Summer)
- 151 **Ballet—The Illusive Art** (3) Johnson  
The art of ballet: its history, aesthetics, and performance. Contributions of the choreographer and performer are examined through lectures, class discussions,

- readings, and presentations by guest lecturers. Attendance at theatrical performances and videotape/film showings. Primarily for nonmajors.
- 152 **Dance in the 20th Century** (3) Withers  
Development of dance as an art form. Understanding the processes of creating dance. Improvisation, composition, choreography, and collaboration are examined. Participatory experiences. Primarily for nonmajors.
- 153 **Dance Aesthetics and Criticism** (3) Johnson  
Theories related to dance as an art form and their application to dance criticism. Viewing of videotapes and films and attendance at theatrical performances.
- 154 **Creative Dance for Children** (3) Withers  
Dance as an expressive art medium for children: concepts, principles, methods and materials.
- 155 **Social and Recreational Forms of Dance** (3) Johnson  
The application of theories and teaching concepts to social and recreational forms of dance.
- 156 **Dance Pedagogy** (3) Johnson  
Philosophy, concepts, methods, materials, and organizational approaches to teaching dance in academic and nonacademic settings. Prerequisite: TrDa 186-87
- 160-61 **Intermediate Ballet** (2-2)  
May be repeated for credit. Prerequisite: TrDa 51 or equivalent.
- 162-63 **Intermediate/Advanced Ballet** (2-2)  
May be repeated for credit. Prerequisite: TrDa 160 or 161 or equivalent.
- 164-65 **Advanced Ballet** (2-2)  
May be repeated for credit. Prerequisite: TrDa 162 or 163 or equivalent.
- 170-71 **Intermediate Modern Dance** (2-2)  
May be repeated for credit. Prerequisite: TrDa 53 or equivalent.
- 172-73 **Intermediate/Advanced Modern Dance** (2-2)  
May be repeated for credit. Prerequisite: TrDa 170 or 171 or equivalent.
- 174-75 **Advanced Modern Dance** (2-2)  
May be repeated for credit. Prerequisite: TrDa 172 or 173 or equivalent.
- 180-81 **Movement Improvisation for Theatre and Dance** (3-3) Stu  
Awareness of body movement, environment, group dynamics, performance and composition through improvisational techniques.
- 182-83 **Dance Composition** (3-3) Withers  
TrDa 182: Basic elements and principles of composition. TrDa 183: Advanced problems in composition. Prerequisite: TrDa 180-81 or equivalent. (Academic year)
- 184-85 **Choreography** (3-3) Withers  
The creation of a dance performance with reference to staging aspects. Prerequisite: TrDa 180-81, 192-93, or equivalent; TrDa 131 recommended. (Academic year)
- 186-87 **Body Alignment and Movement Theory** (3-3) Withers  
Application of principles of anatomy, kinesiology, and physics to the analysis and practice of contemporary dance techniques. (Academic year)
- 190-91 **Dance History** (3-3) Johnson  
History of dance from antiquity to present; emphasis on cultural significance of dance as art, education, and social behavior. Prerequisite for nonmajors: TrDa 186-87 (Academic year)
- 192 **Repertory/Performance** (1) Stu  
Participation in the processes of learning dance repertory and performing dance works. Audition required. May be repeated for credit. (Academic year)
- 193-94 **Dance Styles** (arr.) Stu  
Forms of theatrical dance other than ballet or modern. (Academic year)
- 195 **Selected Topics** (3) Stu  
Topics of current interest in theatre or dance. Topics announced in the Schedule of Classes. May be repeated for credit provided that the topic differs.
- 196 **Independent Study** (1 to 6)  
Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in theatre or dance. Before students are permitted to register for TrDa 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will be directing the study in the department chair.



**198 Internship (3 or 6)**

Staff

Open to seniors majoring in theatre or dance. Work placements with not-for-profit and commercial theatre and dance organizations for an approved number of hours per week. Admission requires departmental approval. May be taken for a maximum of 6 hours. (Fall and spring)

**199 Senior Project (3)**

Staff

Open to seniors majoring in theatre or dance. Before students are permitted to register for TrDa 199, they must submit a written proposal of the plan of study and obtain approval of the faculty member who will be directing the study and the department chair.

**TRAVEL AND TOURISM**

See Human Kinetics and Leisure Studies.

**UNIVERSITY PROFESSORS**

University Professors A. Etzioni, P.J. Caws, S.H. Nasr

Courses numbered in the 770s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program concerned, appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the *Schedule of Classes* under the 700 series. Following is a list of courses that are expected to be taught fairly regularly by University Professors.

Phil

**772 Individualism (3)**

Caws

The concept of the free individual in philosophy, psychology, literature, and politics; individuals and groups, individualism and collectivism, exemplary individuals in biography, autobiography, and fiction, problems of individual and collective agency and identity. For undergraduates, open to graduate students.

Phil

**774 Understanding Technology (3)**

Caws

The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates; open to graduate students.

Phil

**776 Peace Studies and Conflict Resolution (3)**

Caws

The scope and complexity of conceptual and practical issues arising from the problem of war and peace. The main intellectual positions that have been taken and the major works to which they have given rise. For undergraduates; open to graduate students.

Phil

**778 Left and Right in Philosophy and Politics (3)**

Caws

A fundamental inquiry into the concept of the state in terms of entrenched oppositions, individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For undergraduates; open to graduate students.

Phil

**779 Philosophy and Psychoanalysis (3)**

Caws

An exploration of some striking parallels between the topics addressed by Freud's psychoanalytic theories on the one hand and the traditional content of philosophical reflection on the other, with special emphasis on the relation between cognitive theory and therapeutic practice (in both disciplines). For undergraduates; open to graduate students.

Rel

**770 Islamic Civilization and the West (3)**

Natr

The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; the impact of the image of Islam as shown in modern Western scholarship upon the Islamic world. For juniors and seniors; open to graduate students.

Rel

**771 Persian Sufi Literature in East and West (3)**

Natr

The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact in the West and in India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students.

Rel

**772 Mysticism—East and West (3)**

Natr

A thematic examination of major elements and components of mystical traditions, dealing with such issues as the nature of mysticism, the search for ultimate reality, the mystical significance of the cosmos, the mystical science of the soul, and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam.

Rel

**773 Perennial Philosophy (3)**

Natr

The idea of perennial philosophy as developed in the 20th century by A. Huxley, A.C. Coomaraswamy, and certain Neo-Thomists. Doctrines and teachings of perennial philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.

Rel

**775 Man and the Natural Environment (3)**

Natr

The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment.

Rel

**777 Religion and Science (3)**

Natr

The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period. For juniors and seniors; open to graduate students.

Soc

**776 Public Policy Research (3)**

Etcon

Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience.

Soc/Econ/PSc

**779 The Elements of Socioeconomics (3)**

Etcon

A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students; open to qualified undergraduates.



## URBAN PLANNING AND REAL ESTATE DEVELOPMENT

Programs in urban planning and real estate development are offered at the graduate level by the School of Business and Public Management. Courses listed here are open to interested undergraduates.

- 50 Washington, D.C.: History, Culture, and Politics (3) Gillette  
Same as AmCv/Hist/PSc 50.
- 132 Real Estate Investment (3) Handorf  
Same as Fina 132.
- 153 Fundamentals of Urban Planning and Design (3) McGrath  
Studio course for undergraduates. Basic elements of urban planning and design applied to community problems. Survey of planner's role in developing and implementing creative solutions to urban problems. (Spring)
- 154 Survey of American Urban and Regional Planning (3) Parsons  
Examination of the historical roots, recent trends, issues, and new directions of American planning concepts, as well as the social and political forces that shape the character of planning in the United States. The roles of institutions, politicians, planners, and the general public in the planning process. Particular emphasis is placed on urban planning at the local governmental level. (Fall)
- 175-76 American Architecture (3-3) Longstreth  
Same as AmCv 175-76 and Art 176 and 191.
- 177 Introduction to Historic Preservation (3) Staff  
Same as AmCv 177.

## WOMEN'S STUDIES

Professor P.H.M. Lengermann (Director)  
Professorial Lecturer S. Ridder  
Associate Professor P.M. Palmer  
Adjunct Associate Professors J.N. Brantley, R. Spalter-Roth  
Assistant Professorial Lecturer M.B. Pratt

### Committee on Women's Studies

L. Brandt, J.N. Brantley, M.M. Cassidy, C. Deitch, P.H.M. Lengermann, K. Oliver, P.M. Palmer, S. Quitslund, A. Romines, G. Savage, R. Spalter-Roth

Minor in women's studies—Undergraduates who select a minor in women's studies must declare their intention to the director no later than the beginning of their senior year. Students are required to complete at least 15 credit hours for the minor, including two core courses (WStu 120 and 125) and three additional courses chosen from AmCv-Hist 185, Clas 170, Econ 141, Econ 153, Engl 162, Engl 174, Hist 125, Phil 125, Psyc 150, Rel 181, and Soc 155. In addition, students are strongly recommended to take WStu 170 and 183

- 120 Introduction to Women's Studies (3) Staff  
A multidisciplinary examination of historical conditions, cultural norms, and social institutions that define women's status in Western culture. Experiences of girls and women in various racial-ethnic, class, and age groups. Alternative visions for women's (and, by implication, men's) roles and status. Sophomore standing required. (Fall and spring)
- 125 Varieties of Feminist Theory (3) Staff  
A review, through both classical and contemporary texts, of the variety of feminist explanations of women's status. Relationships within the sex gender system and arrangements based on class and race. Evaluation, through the lens of feminist theory, of several of the established academic disciplines in the sciences, social sciences, and humanities. Prerequisite: WStu 120 (Fall and spring)
- 170 Selected Topics in Women's Studies (3) Staff  
Examination and analysis of central issues in women's studies, such as women and difference, women in media, ecofeminism, women and spirituality, psychoanalysis and women. Topic changes each semester, may be repeated for credit. Admission by permission of instructor. (Fall and spring)
- 183 Practicum in Women's Studies (3) Staff  
Study of the changing status of women through supervised assignment to public and private agencies engaged in policy-making, education, political action, and research. Placement arrangements begin the semester prior to registration for this course.

## FACULTY AND STAFF OF INSTRUCTION 1990-1991

### Columbian College of Arts and Sciences

### School of Engineering and Applied Science

### School of Education and Human Development

### School of Business and Public Management

### Elliott School of International Affairs

#### EMERITI

##### Caroline Lander Adams, Professor Emeritus of Botany

B.A. 1925, Illinois College; M.S. 1928, University of Chicago; Ph.D. 1932, University of Wisconsin

##### Frank Duane Allan, Professor Emeritus of Anatomy

B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University and Agricultural and Mechanical College

##### Grover LaMarr Angel, Professor Emeritus of Education

B.A. 1929, High Point College; M.A. in Ed. 1946, Ed.D. 1952, George Washington University

##### Galip Mehmet Arkilic, Professor Emeritus of Engineering and Applied Science

B.S. in M.E. 1946, Cornell University; M.S. 1947, Illinois Institute of Technology; Ph.D. 1954, Northwestern University

##### Robert Edward Baker, Professor Emeritus of Education

B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1954, Catholic University of America; M.A. in Ed. 1956, Ed.D. 1962, George Washington University

##### Ruth Lillian Aaronson Bari, Professor Emeritus of Mathematics

B.A. 1939, City University of New York, Brooklyn College; M.A. 1943, Ph.D. 1966, Johns Hopkins University

##### Shirley Russell Barnett, Associate Professor Emeritus of Spanish

B.A. 1944, Vassar College; M.A. 1946, Vanderbilt University; Ph.D. 1958, University of Minnesota

##### Lee Sheward Bielski, Professor Emeritus of Speech Communication

B.S. 1940, Ohio University; M.A. 1944, University of Michigan

##### Guy Black, Professor Emeritus of Business Economics

B.S. 1941, Harvard University; M.A. 1948, Ph.D. 1951, University of Chicago

##### Gretchen Rogers Bolwell, Professor Emeritus of German

B.A. 1930, M.A. 1931, George Washington University; Ph.D. 1938, Johns Hopkins University

##### Perry Botwin, Professor Emeritus of Special Education

B.S. 1942, Rutgers - The State University; M.A. 1947, New York University; Ed.D. 1957, Columbia University

##### Marcella Brenner, Professor Emeritus of Education

B.S. in Ed. 1934, Johns Hopkins University; M.A. 1940, American University; Ed.D. 1962, George Washington University

##### Harold Frederick Bright, Professor Emeritus of Statistics; Vice President for Academic Affairs Emeritus

B.A. 1937, Lake Forest College; M.S. 1944, University of Rochester; Ph.D. 1952, University of Texas

##### David Springer Brown, Professor Emeritus of Management

B.A. 1936, University of Maine at Orono; Ph.D. 1955, Syracuse University

##### Frederick James Brown, Jr., Professor Emeritus of Education

B.A. 1947, M.Ed. 1951, Western Maryland College; Ed.D. 1962, Columbia University

##### Elizabeth Burtner, Professor Emeritus of Physical Education

B.A. 1927, Hood College; M.A. 1935, Columbia University



- Willard Edmund Caldwell, *Professor Emeritus of Psychology*  
B.A. 1940, M.A. 1941, University of Florida; Ph.D. 1946, Cornell University
- Ali Bulent Cambel, *Professor Emeritus of Engineering and Applied Science*  
B.S. 1942, Robert College, Turkey; M.S. 1946, California Institute of Technology; Ph.D. 1950, University of Iowa
- Wesley Thomas Carroll, *Professor Emeritus of Education*  
B.S. 1913, Iowa State University of Science and Technology; M.A. 1940, Ph.D. 1952, University of Nebraska
- James Harold Coberly, *Professor Emeritus of English*  
B.A. 1933, M.A. 1938, Ph.D. 1949, George Washington University
- Mary Ellen Coleman, *Professor Emeritus of Education*  
B.S. 1937, Madison College; M.A. in Ed. 1950, George Washington University
- Benjamin Carpenter Cruickshanks, *Professor Emeritus of Mechanical Engineering*  
B.S. in M.E. 1920, George Washington University
- Roderic Hollett Davison, *Professor Emeritus of European History*  
B.A. 1937, Princeton University; M.A. 1938, Ph.D. 1942, Harvard University
- William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental)*  
B.A. 1927, Ph.D. 1933, Yale University
- Roy Brandon Eastin, *Professor Emeritus of Business Administration*  
B.A. 1943, M.A. 1945, George Washington University; Ph.D. 1953, American University
- Julian Eisenstein, *Professor Emeritus of Physics*  
B.S. 1941, M.A. 1942, Ph.D. 1948, Harvard University
- Lloyd Hartman Elliott, *Professor Emeritus of Higher Education; President Emeritus of the University*  
B.A. 1937, Glenville State College; M.A. 1939, LL.D. 1967, West Virginia University; Ed.D. 1948, University of Colorado; LL.D. 1963, University of New Hampshire; LL.D. 1965, Colby College; LL.D. 1966, Concord College; LL.D. 1969, University of Maine at Orono; LL.D. 1970, Husson College; LL.D. 1971, Georgetown University; LL.D. 1986, West Virginia Institute of Technology; D.H.C. 1986, Kansai University, Japan; LL.D. 1988, American University
- Richard Ferdinand Ericson, *Professor Emeritus of Management*  
B.A. 1943, M.B.A. 1948, University of Chicago; Ph.D. 1952, Indiana University
- Joseph Foa, *Professor Emeritus of Engineering and Applied Science*  
Dr.ing. (M.E.) 1931, Polytechnic Institute of Torino, Italy; Dr.ing. (A.E.) 1933, University of Rome
- Raymond Richard Fox, *Professor Emeritus of Engineering and Applied Science*  
B.S. in C.E. 1949, M.S. in C.E. 1952, University of Washington; P.E.
- Lyndale Harpster George, *Associate Professor Emeritus of Human Kinetics and Leisure Studies*  
B.S. in P.E. 1948, M.A. in Ed. 1952, A.P.C. 1961, George Washington University
- Samuel W. Greenhouse, *Professor Emeritus of Statistics*  
B.S. 1948, City University of New York, City College; M.A. 1954, Ph.D. 1959, George Washington University
- Francis Stanley Grubar, *Professor Emeritus of Art*  
B.A. 1948, M.A. 1949, University of Maryland; M.A. 1952, Ph.D. 1966, Johns Hopkins University
- Andrew Gyorgy, *Professor Emeritus of International Affairs and Political Science*  
B.A. 1947, J.D. 1958, University of Budapest; M.A. 1939, University of California, Berkeley; Ph.D. 1949, University of California, Los Angeles
- Ira Bowers Hansen, *Professor Emeritus of Zoology*  
B.S. 1928, M.A. 1929, Wesleyan University; Ph.D. 1932, University of Chicago
- Clarence Richard Hartman, *Associate Professor Emeritus of Microbiology*  
B.A. 1933, M.D. 1936, George Washington University
- Roy Hertz, *Research Professor Emeritus of Pharmacology*  
B.A. 1930, Ph.D. 1933, M.D. 1939, University of Wisconsin; M.P.H. 1940, Johns Hopkins University
- Henry William Herzog, *Vice President and Treasurer Emeritus*  
B.S. in C.E. 1930, LL.D. 1978, George Washington University
- Philip Henry Highfill, Jr., *Professor Emeritus of English*  
B.A. 1942, Wake Forest University; M.A. 1948, Ph.D. 1950, University of North Carolina
- Ching-Yao Hsieh, *Professor Emeritus of Economics*  
B.A. 1949, St. John's University, China; M.A. 1958, Ph.D. 1964, George Washington University
- Thelma Hunt, *Professor Emeritus of Psychology*  
B.A. 1924, M.A. 1925, Ph.D. 1927, M.D. 1935, George Washington University

- Joe Lee Jessup, Professor Emeritus of Business Administration  
B.S. in B.A. 1936, University of Alabama; M.B.A. 1941, Harvard University; LL.D. 1964, University of Chungang, Korea
- Eva Mayne Johnson, Professor Emeritus of Psychology  
B.A. 1949, M.A. 1951, Ph.D. 1957, George Washington University
- Kenneth Johnson, Professor Emeritus of Engineering Administration  
B.A. 1931, Indiana State University; Ph.D. 1937, Purdue University
- Thomas Nick Johnson, Professor Emeritus of Anatomy  
B.S. 1944, St. Ambrose College; M.S. 1949, Michigan State University; Ph.D. 1953, University of Michigan
- Samuel Kavruck, Professor Emeritus of Education  
B.S. 1937, M.S. in Ed. 1939, City University of New York, City College; M.A. in Govt. 1950, Ed.D. 1954, George Washington University
- John Kaye, Professor Emeritus of Engineering and Applied Science  
B.S. in M.E. 1939, M.S. in M.E. 1940, California Institute of Technology
- John Whitefield Kendrick, Professor Emeritus of Economics  
B.A. 1937, M.A. 1939, University of North Carolina; Ph.D. 1955, George Washington University
- Richard Alec Kenney, Henry D. Fry Professor Emeritus of Physiology  
B.S. 1945, Ph.D. 1947, University of Birmingham
- James Cecil King, Professor Emeritus of German  
B.A. 1949, M.A. 1950, Ph.D. 1954, George Washington University
- Virginia Randolph Kirkbride, Professor Emeritus of Educational Psychology  
B.A. 1941, M.A. 1942, University of Nebraska; Ed.D. 1959, George Washington University
- Solomon Kullback, Professor Emeritus of Statistics  
B.S. 1927, City University of New York, City College; M.A. 1929, Columbia University; Ph.D. 1934, George Washington University
- John Francis Latimer, Professor Emeritus of Classics  
B.A. 1922, D.Litt. 1964, Mississippi College; M.A. 1926, University of Chicago; Ph.D. 1929, Yale University; D.H.L. 1967, George Washington University
- Thelma Z. Lavine, Elton Professor Emeritus of Philosophy  
B.A. 1936, Radcliffe College; M.A. 1937, Ph.D. 1939, Harvard University
- Sar Levitan, Professor Emeritus of Economics  
B.S.S. 1937, City University of New York, City College; M.A. 1939, Ph.D. 1949, Columbia University
- Ralph Kepler Lewis, Professor Emeritus of Anthropology  
B.A. 1934, Southwest Missouri State College; M.A. 1939, University of Southern California; Ph.D. 1967, Columbia University
- Calvin Darlington Linton, Professor Emeritus of English; Dean Emeritus of Columbian College of Arts and Sciences  
B.A. 1935, George Washington University; M.A. 1939, Ph.D. 1940, Johns Hopkins University
- William Francis Edward Long, Professor Emeritus of Economics  
B.A. 1946, M.A. 1947, Ph.D. 1967, George Washington University
- William Allan MacDonald, Professor Emeritus of Art and Archaeology  
B.A. 1940, Oberlin College; M.A. 1942, Ph.D. 1943, Johns Hopkins University
- Eugene Ross Magruder, Associate Professor Emeritus of Business Administration  
B.B.A. 1950, M.B.A. 1951, University of Texas; Ph.D. 1959, Ohio State University
- Anthony Marinaccio, Professor Emeritus of Education  
Ed.B. 1937, Central Connecticut State College; M.A. 1939, Ohio State University; Ph.D. 1949, Yale University; LL.D. 1961, Parsons College
- Muriel Hope McClanahan, Associate Professor Emeritus of English  
B.A. 1935, Colorado College; M.A. 1937, Ph.D. 1940, University of Pittsburgh
- Margaret McIntyre, Professor Emeritus of Education  
B.S. in Ed. 1949, State University of New York at Buffalo; M.A. 1944, Northwestern University; A.P.C. 1963, George Washington University
- Florence Marie Mears, Professor Emeritus of Mathematics  
B.A. 1917, Goucher College; M.A. 1924, Ph.D. 1927, Cornell University
- Franz Henry Michael, Professor Emeritus of International Affairs and Far Eastern History  
Sinological Diploma 1930, University of Berlin; Referendar 1931, Dr. Jur. 1933, University of Freiburg
- Frank Nelson Miller, Jr., Professor Emeritus of Pathology  
B.S. 1943, M.D. 1948, George Washington University
- James Norman Mosel, Professor Emeritus of Psychology  
B.A. 1940, Colgate University; M.A. 1941, Columbia University



- Leonard Nadler, Professor Emeritus of Human Resource Development and Adult Education**  
B.B.A. 1948, M.S. 1950, City University of New York, City College; Ed.D. 1962, Columbia University
- Charles Rudolph Naeser, Professor Emeritus of Chemistry**  
B.S. 1931, University of Wisconsin; M.S. 1933, Ph.D. 1935, University of Illinois
- Nadine Nadeshda Natov, Professor Emeritus of Russian**  
M.A. 1939, Ph.D. 1941, Pedagogical Institute of Modern Languages, U.S.S.R.; Ph.D. 1969, University of Michigan
- David Nelson, Professor Emeritus of Mathematics**  
B.A. 1939, M.A. 1940, Ph.D. 1946, University of Wisconsin
- Harry Robert Page, Professor Emeritus of Business Administration**  
B.A. 1941, Michigan State University; M.B.A. 1950, Harvard University; Ph.D. 1966, American University
- Kittie Fonley Parker, Professor Emeritus of Botany**  
B.A. 1930, M.A. 1932, University of California, Berkeley; Ph.D. 1946, University of Arizona
- Thomas Martin Peery, Professor Emeritus of Pathology**  
B.A. 1928, D.M.S. 1966, Newberry College; M.D. 1932, Medical University of South Carolina
- Ruth Irene Peterson, Professor Emeritus of Education**  
B.S. 1945, State University of New York at Buffalo; M.S. 1946, Syracuse University; Ph.D. 1971, American University
- Vladimir Petrov, Professor Emeritus of International Affairs**  
M.A. 1967, Ph.D. 1965, Yale University
- Ewing Lakin Phillips, Professor Emeritus of Psychology**  
B.S. 1937, Central Missouri State College; M.A. 1940, University of Missouri; Ph.D. 1949, University of Minnesota
- William Martin Reynolds, Chauncey M. DePew Professor Emeritus of Public Speaking**  
B.A. 1950, Wichita State University; M.A. 1957, Ph.D. 1960, University of Florida
- James Willis Robb, Professor Emeritus of Romance Languages**  
B.A. 1939, Colgate University; M.A. 1950, Middlebury College; Ph.D. 1958, Catholic University of America
- Mary Louise Robbins, Professor Emeritus of Microbiology**  
B.A. 1934, American University; M.A. 1940, Ph.D. 1944, George Washington University
- Daniel David Roman, Professor Emeritus of Management Science**  
B.S. in B.A. 1949, M.A. 1953, Ph.D. 1956, University of Southern California
- Sam Rothman, Professor Emeritus of Engineering Administration**  
B.S. 1943, Long Island University; M.A. 1954, Ph.D. 1959, American University
- Robert Clinton Rutledge, Associate Professor Emeritus of English**  
B.A. 1940, University of Virginia; M.A. 1957, Ph.D. 1966, George Washington University
- Robert Polindexter Sharkey, Professor Emeritus of Economic History**  
B.A. 1948, Princeton University; Ph.D. 1958, Johns Hopkins University
- Benjamin Williams Smith, Professor Emeritus of Biochemistry**  
B.S. 1940, Virginia Polytechnic Institute and State University; M.S. 1947, Ph.D. 1951, George Washington University
- Herbert Ernest Smith, Professor Emeritus of Engineering Administration**  
B.S. 1930, C.E. 1932, City University of New York, City College; M.S. 1936, Ph.D. 1940, New York University
- Richard Saxon Snell, Professor Emeritus of Anatomy and of Orthopaedic Surgery**  
M.B., B.S. 1949, Ph.D. 1955, M.D. 1961, University of London
- Waldo Sommers, Professor Emeritus of Public Administration**  
B.A. 1927, Heidelberg College; M.A. 1934, Ph.D. 1948, Yale University
- Loretta May Stallings, Professor Emeritus of Human Kinetics and Leisure Studies**  
B.A. 1947, Stanford University; M.A. 1950, University of the Pacific; Ed.D. 1965, University of Texas
- George Steiner, Professor Emeritus of Music**  
B.S. 1938, Mus.B. 1938, Mus.M. 1940, Johns Hopkins University
- Karl Ernest Stromsem, Professor Emeritus of Public Administration**  
B.A. 1930, Pomona College; Ph.D. 1935, University of California, Berkeley
- Choy-Tak Taam, Professor Emeritus of Mathematics**  
B.S. 1942, University of Illinois; M.A. 1943, Ph.D. 1945, Harvard University
- Ira Rockwood Telford, Professor Emeritus of Anatomy**  
B.A. 1931, M.A. 1933, University of Utah; Ph.D. 1942, George Washington University

- Ronald Bettes Thompson, Professor Emeritus of European History  
B.A. 1935, Yale University; Ph.D. 1954, University of Chicago
- Rodney Tillman, Professor Emeritus of Education  
B.A. 1943, Henderson State College; M.A. 1949, Ed.D. 1955, Columbia University
- Kathryn Mildred Towne, Professor Emeritus of Home Economics  
B.S. 1923, Montana State University; M.A. 1930, Columbia University
- Carleton Raymond Treadwell, Professor Emeritus of Biochemistry  
B.A. 1944, Battle Creek College; M.S. 1945, Ph.D. 1939, University of Michigan
- William Lewis Turner, Associate Professor Emeritus of English  
B.A. 1934, M.A. 1941, Ph.D. 1952, University of Pennsylvania
- Curtis Edward Tuthill, Associate Professor Emeritus of Psychology  
B.A. 1935, Macalester College; M.A. 1936, Ph.D. 1939, University of Iowa
- Elinor Ulman, Adjunct Professor Emeritus of Art Therapy  
B.A. 1940, Wellesley College; B.S. 1943, Iowa State University of Science and Technology;  
D.ArTh. (Hon.) 1981, Norwich University
- Robert Louis Weintraub, Professor Emeritus of Botany  
B.S. 1931, M.A. 1933, Ph.D. 1938, George Washington University
- Edward Ronald Weismiller, Professor Emeritus of English  
B.A. 1948, Litt.D. 1953, Cornell College; M.A. 1942, Harvard University; D.Phil. 1950, Oxford University
- Warren Reed West, Professor Emeritus of Political Science  
B.A. 1918, George Washington University; Ph.D. 1922, Johns Hopkins University
- Ralph Kirby White, Professor Emeritus of Social Psychology  
B.A. 1929, Wesleyan University; Ph.D. 1937, Stanford University
- Robert Crumpton Willson, Associate Professor Emeritus of Journalism  
B.A. 1951, George Washington University
- Marvin Milton Wolsey, Professor Emeritus of Management  
B.S. 1935, New York University; M.A. 1943, Ph.D. 1967, American University
- Helen Bates Yakobson, Professor Emeritus of Russian  
B.S. 1935, Harbin Law School, Manchuria
- Donnell Brooks Young, Professor Emeritus of Zoology  
B.S. 1911, Amherst College; Ph.D. 1923, Columbia University
- Shao Wen Yuan, Professor Emeritus of Engineering and Applied Science  
B.S. 1946, University of Michigan; M.S. 1937, Ph.D. 1941, California Institute of Technology  
Ae.E. 1939, Stanford University

## ACTIVE

- Eugene Abravanel, Professor of Psychology  
B.A. 1955, University of Michigan; M.A. 1960, Swarthmore College; Ph.D. 1965, University of California, Berkeley
- Achilles Grammenos Adamantiades, Adjunct Professor of Engineering  
Diploma 1957, National Polytechnic, Greece; Ph.D. 1966, Massachusetts Institute of Technology
- Joseph Morris Aein, Adjunct Professor of Engineering  
B.S. 1958, Massachusetts Institute of Technology; M.S.E.E. 1958, Ph.D. 1962, Purdue University
- Hugh Lecaine Agnew, Assistant Professor of History and International Affairs  
B.A. 1975, Queen's University at Kingston, Canada; M.A. 1976, Ph.D. 1981, Stanford University
- Mohamed Abd El-Aziz Ahmed, Assistant Professorial Lecturer in Engineering  
B.S. 1970, Diploma 1980, Helwan University, Egypt; M.S. 1983, D.Sc. 1988, George Washington University
- Yoshio Akiyama, Professorial Lecturer in Mathematics  
M.A. 1963, Andrews University; Ph.D. 1967, University of Minnesota
- Ali A. Alani, Assistant Research Professor of Biological Sciences  
B.S. 1974, M.S. 1975, University of Baghdad, Iraq; M.S. 1979, Ph.D. 1985, University of Borealis, Finland
- John D. Albertson, Adjunct Assistant Professor of Music  
B.M. 1981, Catholic University of America
- Marshall W. Alcorn, Jr., Assistant Professor of English  
B.A. 1970, Texas Lutheran College; M.A. 1976, Vanderbilt University; Ph.D. 1981, University of Texas
- Charles Alexander, Jr., Adjunct Professor of Engineering  
B.S. 1962, Lowell Technological Institute; M.S. 1965, University of New Hampshire; Ph.D. 1967, University of Maryland



- Yonah Alexander, Research Professor of International Affairs**  
B.A. 1954, Roosevelt University; M.A. 1955, University of Chicago; Ph.D. 1965, Columbia University
- Nikitas Anestis Alexandridis, Professor of Engineering and Applied Science**  
B.S.E.E. 1966, Ohio University; M.S. 1967, Ph.D. 1971, University of California, Los Angeles
- Catherine Jean Allen, Professor of Anthropology**  
B.A. 1969, St. John's College, Maryland; M.A. 1972, Ph.D. 1978, University of Illinois
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## INDEX

- Abbreviations, key to, 107  
Academic work load for employed students, *see* college or school concerned  
Accountancy, 108; *see also* School of Business and Public Management  
Accreditation, 9  
Administration, officers of, 14  
Admissions, 17; *see also* college or school concerned  
Advanced standing, 19; *see also* college or school concerned  
Alumni association, 11  
American studies, 109  
Anthropology, 111  
Applied mathematics, *see* Mathematics  
Applied science, 115  
Art, 116  
Athletics, 50, *see also* Exercise and sport activities  
Auditing, 41  
Awards, 33  
Biological sciences, 124  
Board of trustees, 12  
Business administration, *see* School of Business and Public Management  
Business and Public Management, School of, 88  
Business economics and public policy, *see* School of Business and Public Management  
Calendar, 5  
Campus life, office of, 48  
Career and cooperative education center, 47  
Certification curricula for teachers, 85  
Changes in program of study, 40  
Chemistry, 128  
Chinese, *see* East Asian languages and literatures  
Civil, mechanical, and environmental engineering, 131; *see also* School of Engineering and Applied Science  
Classical archaeology and anthropology, *see* Art and Anthropology  
Classical archaeology and classics, *see* Art and Classics  
Classical art and archaeology, *see* Art and Classics  
Classics, 135  
College, schools, and division of the university, 8  
Columbian College of Arts and Sciences, 52  
Communication, 137  
Computer information and resource center, 47  
Computer science, *see* Electrical engineering and computer science; *see also* Mathematics, Management science, Statistics/computer and information systems, School of Business and Public Management, School of Engineering and Applied Science  
Conduct, regulations concerning, 40  
Consortium of universities, 10  
Continuing Education, Division of, 102  
Continuous enrollment, 41  
Counseling, *see* Human services  
Counseling center, 46  
Course numbers, explanation of, 108  
Courses of instruction, 108  
Credit, 41  
    By examination, 19  
    Earned through USAFI, DANTES, 20  
    Explanation of amount of, 108  
    For service school courses, 20  
    From other institutions, 19; *see also* college or school concerned  
    Post-admission transfer, 41  
    Repeating courses for, *see* college or school concerned  
    Transfer of, within the university, 40; *see also* college or school concerned  
Criminal justice, *see* Sociology  
Dance, *see* Theatre and dance  
Dean of students, office of, 45  
Dean's honor list, *see* college or school concerned  
Declaration of major, Columbian College, 61  
Disabled student services, 48  
Dishonesty, academic, regulations concerning, 39  
Dismissal of students, 43  
Drama, *see* Theatre and dance  
Dropping courses, 38; *see also* college or school concerned  
Early admission plan, 18  
Early modern European studies, 141  
East Asian languages and literatures, 141  
East Asian studies, 143  
Economics, 144  
Education and Human Development, School of, 77  
Educational leadership, 146  
Educational opportunity program, 48  
Electrical engineering and computer science, 147; *see also* School of Engineering and Applied Science  
Elliott School of International Affairs, 95  
Emeriti faculty, 244  
Employment, student, 31

- Engineering and Applied Science, School of.** 66  
**Engineering management.** 154  
**Engineering science, see** Civil, mechanical, and environmental engineering  
**English.** 154  
**English as a foreign language.** 160  
**Environmental studies.** 161  
**Equal opportunity, university policy on.** 8  
**Examinations:**  
   American College Testing Program. 17  
   College Board:  
     Achievement Tests. 17, 20  
     Advanced Placement Tests. 19  
     College-Level Examination Program. 19  
     Scholastic Aptitude Tests. 17  
   Columbian College special departmental. 59  
   English as a foreign language, test of (TOEFL). 21  
   Exercise and sport activities, *see* Human kinetics and leisure studies  
   Exercise and sport science. 85  
   Faculty and staff of instruction. 244  
   Fees and financial regulations. 23  
     Residence halls and food service. 45  
   Finance. 162; *see also* School of Business and Public Management  
   Financial aid. 27  
   Financial encumbrance for nonpayment of fees. 25  
   Financial regulations. 23  
   Fine arts, *see* Art  
   Food service. 45  
   French, *see* Romance languages and literatures  
   Geography and regional science. 163  
   Geology. 165  
   Germanic languages and literatures. 167  
   Grades. 38; *see also* college or school concerned  
   Graduation. 42; *see* Calendar for dates  
   Grants. 30  
   Greek, *see* Classics  
   Handicapped students, *see* Disabled student services  
   Health and accident insurance. 46  
   Health service, student. 46  
   Hebrew, *see* Classics  
   History. 169  
   Honors. 42; *see also* department or school concerned  
   Honors program. 51, 174  
   Housing and residence life. 45  
   Human kinetics and leisure studies. 175; *see also* School of Education and Human Development  
   Human resource development. 179  
   Human resources management, *see* School of Business and Public Management  
   Human services. 179; *see also* School of Education and Human Development  
   Humanities. 180  
   Inactive status. 41  
   Incomplete/authorized withdrawal. 40  
   Incomplete, removal of, *see* college or school concerned  
   Information systems, *see* School of Business and Public Management  
   Insurance, health and accident. 46  
   Interdisciplinary programs, Columbian College. 62  
   International affairs. 180  
   International Affairs, Elliott School of. 95  
   International business. 182; *see also* School of Business and Public Management  
   International services. 47  
   International students  
     Admission. 21  
     Financial aid. 32  
   Italian, *see* Romance languages and literatures  
   Japanese, *see* East Asian languages and literatures  
   Journalism. 183  
   Judaic studies. 185  
   Korean, *see* East Asian languages and literatures  
   Latin, *see* Classics  
   Latin American studies. 186  
   Leave of absence. 41  
   Liberal arts, program in. 187  
   Libraries. 11, 43  
   Linguistics. 188  
   Loans. 31  
   Logistics, operations, and materials management, *see* School of Business and Public Management  
   Management science. 188  
   Marketing, logistics, and operations management. 190; *see also* School of Business and Public Management  
   Mathematics. 191  
   Mechanical engineering, *see* Civil, mechanical, and environmental engineering; *see also* School of Engineering and Applied Science  
   Medical technology, *see* School of Medicine and Health Sciences  
   Bulletin  
   Medicine and Health Sciences, School of. 101; *see also* School of Medicine and Health Sciences Bulletin  
   Middle Eastern studies. 195  
   Multicultural student services center. 4  
   Music. 196  
   National Law Center, *see* National Law Center Bulletin  
   National Teacher Examination. 83  
   Naval science. 200  
   NROTC. 200  
   Ninety-hour program, bachelor's degree, Columbian College. 57  
   Elliott School. 99  
   Nondegree status. 20, 102



- Off-campus programs, *see* Division of Continuing Education
- Office of campus life, 48
- Office of university students, 103
- Officers of administration, 14
- Operations research, 202
- Pass/no pass option, *see* college or school concerned
- Pharmacology, 203
- Philosophy, 204
- Physical education, *see* Human kinetics and leisure studies
- Physical science, *see* Chemistry
- Physics, 206
- Placement examinations, 19; *see also* department concerned
- Polish, *see* Slavic languages and literatures
- Political communication, 208
- Political science, 209
- Portuguese, *see* Romance languages and literatures
- Post-admission transfer credit, 41
- Premedical curriculum, 65
- Prepaid payment plans, 25
- Prizes, 33
- Probation, *see* college, school, or division concerned
- Programs, right to make changes in, 40
- Property responsibility, 52
- Psychology, 213
- Public administration, 216
- Radio-television, *see* Communication
- Reading center, 46
- Readmission, 21, 38
- Refunds, 26
- Registration, 37
- Regulations, university, 37; *see also* Fees and financial regulations, and college, school, or division concerned
- Release of student information, university policy on, 43
- Religion, 216
- Religious life, 49
- Residence halls, 45
- Residence requirements, 42; *see also* college or school concerned
- Romance languages and literatures, 219
- Romanian, *see* Romance languages and literatures
- ROTC, 52
- Rules of the university, right to change, 43
- Russian, *see* Slavic languages and literatures
- Scholarship requirements, 38; *see also* college, school, or division concerned
- Scholarships, *see* Financial aid
- Senate, Faculty, 18
- Serbo-Croatian, *see* Slavic languages and literatures
- Service-learning program, 225
- Columbian College regulations, 64
- Service school courses, credit for, 19
- 700 series, 225
- Slavic languages and literatures, 226
- Sociology, 227
- Spanish, *see* Romance languages and literatures
- Spanish American literature, *see* Romance languages and literatures
- Special education, *see* Teacher preparation and special education
- Special honors, 42; *see also* department concerned
- Special programs, 51
- Speech and hearing, 230
- Speech and hearing center, 46
- Speech communication, *see* Communication
- Statistics computer and information systems, 231
- Strategic management and public policy, 235
- Student employment, 31, 46
- Student government, 49
- Student health service, 46
- Student services, 45
- Student organizations, 49
- Study abroad, 51
- Summer scholar program, 104
- Summer sessions, 105; *see also* Summer Sessions Announcement
- Suspension, *see* college, school, or division concerned
- Systems analysis and engineering, *see* School of Engineering and Applied Science
- Teacher education, *see* Teacher preparation and special education
- Teacher preparation and special education, 235
- Television, GW, 11
- Theatre and dance, 237
- Transcripts of record, 41
- Transfer students, admission, 18
- Transfer within the university, 40
- Travel and tourism, *see* Human kinetics and leisure studies
- Tuition, 23
- Advance deposit, 18
- University Professors' courses, 241
- University students, office of, 103
- Urban planning and real estate development, 243
- Veterans benefits, 32
- Waiver examinations, *see* Examinations
- Withdrawal, 26, 39, 40; *see also* college, school, or division concerned
- Women's studies, 243
- Writing center, 47
- Yiddish, *see* Classics

## GRADUATE PROGRAMS

The George Washington University offers graduate programs in the following fields. Detailed information is available in the Graduate Programs Bulletin.

### Graduate School of Arts and Sciences

Administrative Sciences  
American Civilization  
American Literature  
Anatomy  
Anthropology  
Applied Mathematics  
Applied Statistics  
Art  
Art History  
Art Therapy  
Biochemistry  
Biological Sciences  
Chemistry  
Chemical Toxicology  
Clinical Microbiology  
Criminal Justice  
Economics  
English Literature  
Environmental Science  
Forensic Sciences  
Genetics  
Geobiology  
Geochemistry  
Geography

Geology  
History  
Legislative Affairs  
Mathematics  
Mathematical Statistics  
Microbiology  
Museum Studies  
Music  
Pathology  
Pharmacology  
Physics  
Political Science  
Psychology  
Public Policy  
Radiological Sciences  
Religion  
Sociology  
Speech—Language Pathology  
and Audiology  
Statistical Computing  
Statistics  
Telecommunication  
Theatre  
Women's Studies

### School of Engineering and Applied Science

Aeronautics and Astronautics  
Artificial Intelligence  
Civil Engineering  
Communications Engineering  
Computer-Aided Design  
Computer Architecture  
Computer Science  
Construction and Facilities  
Management  
Electrical Engineering  
Energy and Power Systems  
Engineering Management  
Environmental Engineering  
Fluid Mechanics and Thermal  
Sciences

Geotechnical Engineering  
Information Management  
Management Science  
Manufacturing and Robotics  
Materials Science  
Mathematical Optimization  
Mechanical Engineering  
Medical Engineering  
Networks and Controls  
Operations Research  
Public Works Management  
Structural Engineering  
Telecommunications and Computer  
Transportation Management  
Water Resources Engineering

### School of Education and Human Development

Administration of College Student  
Development Services  
Counseling  
Curriculum and Instruction  
Education Policy Studies  
Education Technology Leadership  
Elementary Education  
Elementary/Secondary  
Administration  
Exercise Science

Higher Education Administration  
Human Resource Development  
International Education  
Museum Education  
Reading Progress Management  
Secondary Education  
Special Education  
Supervision  
Tourism Administration



### **School of Business and Public Management**

Accountancy  
Association Management  
Business Administration  
Health Services Administration

Information Systems Technology  
Public Administration  
Taxation  
Urban and Regional Planning

### **Elliott School of International Affairs**

International Affairs  
East Asian Studies  
Latin American Studies

Russian and East European Studies  
Science, Technology, and Public  
Policy  
Security Policy Studies

### **National Law Center**

The National Law Center, the oldest law school in the District of Columbia, has an enrollment of approximately 1,600 full- and part-time students. The purpose of the Law Center is to prepare men and women to meet the needs of society in many fields of law and to encourage scholarly research and writing in the law. The Law Center seeks to fulfill these objectives through a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors: an extensive clinical law program, in which students learn legal skills by actual practice; two law journals that specialize in public law and international law; trial practice; participation in the Van Vleck Appellate Case Club and several other moot court competitions; and a series of student professional co-curricular activities. The Law Center also offers a program of graduate legal education and a continuing legal education program for members of the bar. Further information is available in the National Law Center Bulletin.

Undergraduates are eligible to take courses in the National Law Center under the following conditions. Students must demonstrate that they are qualified to undertake the work of a given law course as well as the relevance of the course to their programs of study. Permission must be secured from the student's advisor, the dean of the school in which the student is enrolled, and the assistant dean for graduate programs of the National Law Center. Registration is approved on a space-available basis after all Law Center students have registered. Law courses are graded on a Pass/No Pass basis for undergraduates.

### **School of Medicine and Health Sciences**

The School of Medicine and Health Sciences, the eleventh oldest medical school in the United States, provides education for medical students, physician assistants, nurse practitioners, and other health professionals. At the graduate level, the School offers the Master of Public Health as well as the Doctor of Medicine degree program. The 600 medical students are a heterogeneous group representing a broad cross section of geographic, social, ethnic, and academic backgrounds. The faculty numbers more than 1,600, with 115 in the basic science disciplines. Some 70 basic science faculty and 500 clinical faculty have full-time appointments. The faculty includes voluntary faculty with active practices in the Washington area and individuals who serve on the staffs of the National Institutes of Health and other federal medical facilities; some are the physicians and scientists who guide the health policies of the nation. The city of Washington provides the medical student with a unique opportunity to observe government agencies, legislative institutions, and private organizations that influence the planning of health care delivery in our society. Teaching facilities provide the full range of experiences necessary to prepare the primary-care physician, the clinical specialist, and the teacher-investigator. Further information is available in the School of Medicine and Health Sciences Bulletin.

In addition to the combined degrees of Bachelor of Arts and Doctor of Medicine described in this Bulletin under Columbian College of Arts and Sciences, the

School of Medicine and Health Sciences offers an early selection program intended to give talented and committed students early assurance of admission to the M.D. program. Students of exceptional promise are chosen for the early selection program at the end of their sophomore year and are expected to modify their planned curriculum for the junior and senior years toward more creative and difficult course choices. Early assurance of admission is planned to provide students the freedom to pursue a rigorous liberal education, while completing minimal premedical requirements without concern for the grade-point average. Specific details about the early selection program are available through the Office of Admissions of the School of Medicine and Health Sciences.



## DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY

**Columbian College of Arts and Sciences** Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), and Bachelor of Science (B.S.)

**Graduate School of Arts and Sciences** Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Music (M.Mus.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

**School of Medicine and Health Sciences** Associate in Science (A.S.), Bachelor of Science (B.S.), Master of Public Health (M.P.H.), and Doctor of Medicine (M.D.)

**National Law Center** Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

**School of Engineering and Applied Science** Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engt.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

**School of Education and Human Development** Bachelor of Arts in Education and Human Development (B.A. in Ed & H.D.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education and Human Development (M.A. in Ed & H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

**School of Business and Public Management** Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Master of Urban and Regional Planning (M.U.&R.P.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.)

**Elliott School of International Affairs** Bachelor of Arts (B.A.) and Master of Arts (M.A.)

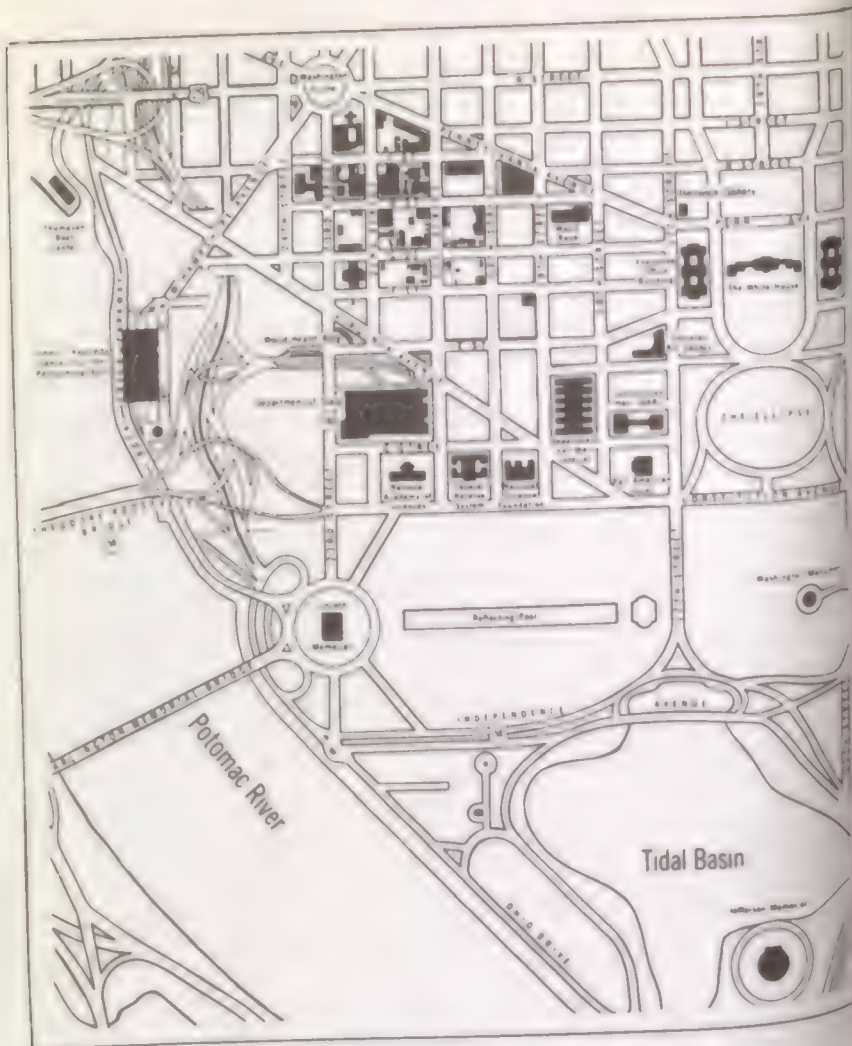
The  
George  
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# The George Washington University Bulletin

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Graduate  
Programs  
1991–1992



THE GEORGE WASHINGTON UNIVERSITY CAMPUS WASHINGTON, D.C.

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# THE GEORGE WASHINGTON UNIVERSITY BULLETIN

## GRADUATE PROGRAMS 1991-1992

Graduate School of Arts and Sciences  
School of Engineering and Applied Science  
School of Education and Human Development  
School of Business and Public Management  
Elliott School of International Affairs  
Division of Continuing Education

Please address correspondence to the office concerned at the George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Undergraduate Programs, the National Law Center, or the School of Medicine and Health Sciences, please request the appropriate Bulletin.

Information in this Bulletin is generally accurate as of fall 1990. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.



## CONTENTS

5	The Academic Calendar
7	The University
17	Fees and Financial Regulations
21	Financial Aid
26	Prizes
28	University Regulations
35	Student Services
40	Graduate School of Arts and Sciences
51	School of Engineering and Applied Science
68	School of Education and Human Development
83	School of Business and Public Management
101	Elliott School of International Affairs
107	Division of Continuing Education
111	Summer Sessions
112	Research Centers and Institutes
113	Courses of Instruction
115	Accountancy
117	Administrative Sciences
120	American Studies
123	Anatomy
124	Anthropology
128	Applied Science
128	Art
133	Art Therapy
134	Association Management
135	Biochemistry
137	Biological Sciences
139	Chemistry
142	Civil, Mechanical, and Environmental Engineering
158	East Asian Languages and Literatures
158	East Asian Studies
159	Economics
164	Educational Leadership
171	Electrical Engineering and Computer Science
185	Engineering Management
189	English
191	Environmental and Resource Policy
192	Environmental Science
193	Finance
194	Forensic Sciences
199	Genetics
200	Geobiology
201	Geography and Regional Science
202	Geology
205	Gerontology
205	Health Services Management and Policy
208	History
212	Human Kinetics and Leisure Studies
214	Human Services
217	Individual Graduate Programs
217	International Affairs
219	International Business
220	Latin American Studies
221	Legislative Affairs
221	Management Science

228	Marketing, Logistics, and Operations Management
230	Mathematics
233	Microbiology
235	Museum Studies
236	Music
238	Operations Research
241	Pathology
242	Pharmacology
244	Philosophy
245	Physics
247	Physiology
248	Political Psychology
249	Political Science
254	Psychology
258	Public Administration
262	Public Policy
263	Radiological Sciences
264	Religion
265	Romance Languages and Literatures
265	Russian and East European Studies
266	Science, Technology, and Public Policy
267	Security Policy Studies
268	Sociology
271	Speech and Hearing
273	Statistics/Computer and Information Systems
277	Strategic Management and Public Policy
278	Teacher Preparation and Special Education
287	Telecommunication
288	Theatre and Dance
289	University Professors
291	Urban Planning and Real Estate Development
293	Women's Studies
295	Faculty and Staff of Instruction
344	Index



# THE ACADEMIC CALENDAR 1991-1992

<b>August 1991</b> S M T W T F S  4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>December 1991</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>April 1992</b> S M T W T F S  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
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## 1991 Fall Semester

August 22-23	Advising and testing for entering students
August 26	Classes begin
Aug. 26-Sept. 6	Late registration*
September 2	Labor Day (holiday)
September 6	Fall Convocation
October 1	Applications due for February graduation
	Applications due for November Master's Comprehensive Examinations in the Elliott School of International Affairs and the School of Business and Public Management
October 7	Applications due for November Master's Comprehensive Examinations and Doctoral Qualifying Examinations in the School of Engineering and Applied Science
October 14	Columbus Day (holiday)
November 1	Applications due for spring semester financial aid
	Applications due for Ed.D., Ed.S., and M.A. in Ed.&H.D. Comprehensive Examinations
November 1-2	Elliott School of International Affairs and School of Business and Public Management Master's Comprehensive Examinations
November 4	Registration for spring semester classes begins*
November 15	Doctoral dissertations due from February candidates in the School of Education and Human Development

\*Registration is by telephone only; consult the *Schedule of Classes*.

- November 25 Doctoral dissertations due from February candidates in the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, and the School of Business and Public Management
- November 28-29 Thanksgiving holiday
- December 7 Ed.D., Ed.S., and M.A. in Ed.&H.D. Comprehensive Examinations
- December 9 Last day of fall semester classes
- December 10-11 Reading period
- December 12-20 Examination period

### 1992 Spring Semester

- January 2 Master's theses due from February candidates  
All degree requirements to be completed and reported to the Graduate School of Arts and Sciences for February graduation
- January 10 Advising and testing for entering students
- January 13 Classes begin
- January 13-23 Late registration\*
- January 20 Martin Luther King Day (holiday)
- February 1 Applications due for May graduation
- February 10 Applications due for March Master's Comprehensive Examinations and Doctoral Qualifying Examinations in the School of Engineering and Applied Science
- February 18 Winter Convocation
- February 17 George Washington's birthday observed (holiday)
- February 22 Doctoral dissertations due from May candidates in the School of Education and Human Development
- February 27 Applications due for April Master's Comprehensive Examinations in the Elliott School of International Affairs and the School of Business and Public Management
- March 1 Doctoral dissertations due from May candidates in the Graduate School of Arts and Sciences and the School of Engineering and Applied Science
- March 18-20 Spring recess
- March 15 Applications due for Ed.D., Ed.S., and M.A. in Ed.&H.D. Comprehensive Examinations
- March 18 Doctoral dissertations due from May candidates in the School of Business and Public Management
- April 1 Deadline for submission of summer sessions and 1992-93 graduate financial aid applications
- April 6 Registration for fall semester classes begins\*
- April 10-11 School of Business and Public Management and Elliott School of International Affairs Master's Comprehensive Examinations
- April 11 Ed.D., Ed.S., and M.A. in Ed.&H.D. Comprehensive Examinations
- April 13 Master's theses due from all May candidates except those in the Elliott School of International Affairs
- April 16 All degree requirements to be completed and reported to the Graduate School of Arts and Sciences for May graduation
- April 27 Last day of spring semester classes  
Master's theses due from May candidates in the Elliott School of International Affairs
- April 28-29 Reading period
- April 30-May 8 Examination period
- May 10 Commencement

\* Registration is by telephone only; consult the Schedule of Classes



## THE UNIVERSITY

### History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half-century, the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he hoped to see established.

### Purpose and Objectives

The purpose of The George Washington University was to realize "the aspirations of Washington, Jefferson and Madison, for the erection of a university at the seat of the Federal Government." Over the years it has been the aim to develop the

University ideal in the nation's capital with a view toward meeting the changing needs of society while continuing to pursue the traditional principles of learning and research.

The George Washington University is dedicated as an institution of higher learning to promote the general advancement of human knowledge and understanding and the development of every student to his or her highest potential so that each may make the maximum contribution to the improvement of the standards, mores, and scientific and cultural climate of all peoples.

In pursuit of excellence in education, the University dedicates itself to freedom of inquiry, respect for truth, and support for research. The University is committed to preserving a curriculum that embodies the content and spirit of the liberal arts and promotes academic specialization and professional education, fostering respect and communication among different cultures, and maintaining a continuing process of institutional self-assessment and adaptation to meet the rapidly changing needs of society.

The University recognizes its special opportunities in and obligations to one of the principal capitals of the world. It is a primary objective of the University to utilize its location in the nation's capital in continuing the development of a great nationally and internationally oriented university.

### University Policy on Equal Opportunity

George Washington University does not discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, or veteran status. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### The College, Schools, and Division

George Washington University includes nine academic units, as follows:

**Columbian College of Arts and Sciences\*** offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music.

**The Graduate School of Arts and Sciences†** offers advanced study and research leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science in Forensic Science, and Doctor of Philosophy.

**The School of Medicine and Health Sciences** offers work leading to the degrees of Associate in Science, Bachelor of Science, Bachelor of Science in Health Science, Master of Public Health, and Doctor of Medicine.

**The National Law Center‡** offers courses leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.

\* Columbian College of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

† The Graduate School of Arts and Sciences cooperates with the School of Medicine and Health Sciences in offering programs leading to the joint degrees of Master of Science-Doctor of Medicine and Doctor of Medicine-Doctor of Philosophy.

‡ The National Law Center cooperates with the Elliott School of International Affairs, Graduate School of Arts and Sciences, and the School of Business and Public Management in offering programs leading to joint Juris Doctor and master's degrees.



The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Human Development and Bachelor of Science in Human Kinetics and Leisure Studies and graduate studies leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Association Management, Master of Business Administration, Master of Health Services Administration, Master of Public Administration, Master of Science in Information Systems Technology, Master of Taxation, Master of Urban and Regional Planning, Specialist in Health Services Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts.

The Division of Continuing Education assists in providing continuing education programs for adult students by administering or coordinating the off-campus credit offerings of the colleges and schools of the University, at both the undergraduate and graduate levels. Noncredit courses are also offered through the Division.

### Academic Status

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Master of Public Health program has full accreditation from the Council on Education for Public Health. All undergraduate engineering curricula, including the computer engineering option, of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible bachelor's, master's, and doctoral degree programs; the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs, the master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management has maintained full membership in the Middle Atlantic Association of Colleges of Business

Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Master of Urban and Regional Planning degree program is recognized by the American Planning Association. The Master of Association Management degree program is recognized by the American Society of Association Executives. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech-language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech-Language Pathology and Audiology.

### Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions.

A new campus in Northern Virginia for graduate studies, research projects, and professional development programs is planned to begin operations in 1991. The campus is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

### Consortium of Universities of the Washington Metropolitan Area

George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities. Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation, except LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.



## **The University Libraries**

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the libraries of the National Law Center and the School of Medicine and Health Sciences.

These collections contain more than 1,600,000 volumes. Endowments supplementing the University appropriation provide research materials in the social sciences, the humanities, engineering, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained at library service desks. Individual and class instruction in the use of the library and orientation to library facilities are given by librarians upon request.

The library strives to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, the reference staff identifies and locates desired research materials not easily found through more traditional methods. The staff assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Graduate degree candidates at George Washington University may, upon application, be issued a Consortium library card that permits direct borrowing from the main campus libraries of most other academic institutions in the Washington area. Graduate students may also obtain books and journal articles on inter-library loan from other libraries in the city, throughout the United States, and in various other countries.

ALADIN, the computerized catalog of library materials, lists the holdings of the Gelman Library and the libraries of seven other universities in the Washington area. The catalog can be accessed from terminals in the libraries or from personal computers on campus or elsewhere.

## **GW Television**

The main television resource of the University is GWTV, a state-of-the-art ITFS, multichannel broadcast facility. GWTV develops courses and programs in cooperation with academic departments for broadcast off campus; produces videotapes for class use and for continuing professional education; helps expand a program of national and international teleconferences; and manages the acquisition and maintenance of television equipment and facilities in various instructional units.

GWTV has the capability to receive from and transmit to any communications satellite. Video teleconference programs are delivered to a number of on-campus locations, where participants can interact by telephone link with the originating site.

## **Office of Alumni Relations**

The Office of Alumni Relations, in conjunction with the General Alumni Association, makes available to alumni and their families a program of services and educational and cultural events. Alumni are encouraged to inquire about available services and programs at the Office of Alumni Relations and to keep the Office informed of any changes in address or occupation.

## **General Alumni Association**

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of Continuing Education students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of CCEW certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.

### **The Board of Trustees of the University**

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an ex officio member. Alumni trustees are indicated by an asterisk.

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## FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the 1991 summer sessions and the academic year 1991-92.

### Tuition Fees

For graduate study in the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, the School of Education and Human Development, the School of Business and Public Management, the Elliott School of International Affairs, and the Division of Continuing Education:

#### On-Campus Programs

Graduate students, per credit hour .....	490
Nondegree students, per credit hour .....	490
Summer sessions, all students except those in the School of Engineering and Applied Science, per credit hour .....	445
Summer sessions, all students in the School of Engineering and Applied Science, per credit hour .....	475

#### Off-Campus Programs

Tuition rates for off-campus graduate study vary by program and location. The most prevalent tuition rates range from \$300 to \$400 per credit hour. Please check the *Schedule of Off-Campus Programs* for the tuition rate that pertains to any given program.

**Registration Fee** (nonrefundable; charged all students per semester and summer registered):

Registration prior to the beginning of the semester .....	25
Registration during the first week of the semester .....	75
Registration after the first week of the semester .....	125

**Marvin Center Fee** (charged all students registered on campus)—\$12.60 per credit hour, to a maximum of \$126 per semester

**Additional Course Fees**—In certain courses additional fees, such as laboratory and material fees, are charged by semester as indicated in the course descriptions. If breakage of apparatus is in excess of the normal amount provided for in the laboratory fee, the student will be required to pay such additional charges as are determined by the department concerned.

**Computer Usage Fees** (charged for courses that use the computer facilities of the University)—Applicable fees are listed in the *Schedule of Classes* for each semester. The maximum computer usage fee is \$100 for any semester.

### Special Fees and Deposits

Application fee (all degree candidates), nonrefundable .....	\$45
Graduation fee (charged all students applying for graduation) .....	78
Late-payment fee (see Payment of Fees, below) .....	50
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason .....	15
Binding master's thesis, .....	30

Microfilm service, binding dissertation, and printing announcement of final examination (doctoral candidates) . . . . .	13
English test for international students (when required) . . . . .	20
Statement issued by the Department of Romance Languages and Literatures certifying the degree of oral and/or written fluency and command of the French, Italian, Portuguese, or Spanish languages . . . . .	50
Transcript fee . . . . .	3
Replacement of lost or stolen picture identification card . . . . .	25
Replacement of diploma . . . . .	50

Payment of tuition for thesis or dissertation research entitles the candidate during the period of registration, to the advice and direction of the member of the faculty under whom the thesis or dissertation is to be written. In case a thesis or dissertation is unfinished, additional credit hours may be required in accordance with the regulations of the school in which the student is registered.

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the use of the University library; (2) the services of the Career and Cooperative Education Center; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified. These privileges terminate when the student withdraws or is dismissed from the University.

#### Postdoctoral Study

Those who have graduated from George Washington University with a Ph.D., Ed.D., D.Sc., D.B.A., or D.P.A. may continue any studies in the University without payment of tuition (contingent upon the availability of space) and may enjoy all University library privileges. Such graduates are required to pay a nominal fee based on the prevailing credit hour rate for one credit hour, as well as the Marvin Center fee, in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library material is paid by the graduate. Special arrangements for such privileges must be made with the dean two months in advance of the semester in which the graduate wishes to register. Postdoctoral work taken under this privilege may not be taken for credit.

#### Payment of Fees

When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 credit hours or more may use a deferred payment plan at the time of each registration, which permits payment of one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the first day of the semester to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to use



deferred payment unless the total tuition and fee charges exceed the value of the tuition awards by \$2,600 or more. Under such circumstances the student may be permitted to pay one-half of the amount due at the time of registration and to defer the balance.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

**GW Monthly Payment Plan**—The University's Monthly Payment Plan is available to all students. Upon receipt of the appropriate application, the University will establish an account and mail payment coupons and envelopes for use to ensure proper credit of payments. The plan covers an academic year (excluding summer sessions) and requires ten monthly payments, May through February. Payments must be received by the 10th of each month. If a decision is made after May to use this plan, all missed payments must be made to bring the account current to the time participation is initiated. There is no charge and no interest for using the plan if all payments are made as scheduled.

### Off-Campus Courses

Fees for each semester are due and payable in full at the time of each registration; however, a student registering for a credit course lasting 13 weeks or longer may use deferred payment at each registration to make payments in two equal installments—one-half at the time of registration and one-half by the eighth week of the semester. Payments are due at the stipulated times. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the beginning of each semester to the date payment is made.

Students receiving partial government tuition assistance, employee benefits, and partial scholarships must pay their portion of the tuition in full at the time of registration.

Except for specified special sessions, tuition and fees for credit courses lasting less than 13 weeks and for all noncredit courses are payable in full at registration.

### Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the college, school, or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. Complete withdrawal from all courses (on-campus students):
 

Withdrawal dated on or before the end of the first week of the semester . . . . .	80%
Withdrawal dated on or before the end of the second week of the semester . . . . .	60%
Withdrawal dated on or before the end of the third week of the semester . . . . .	40%
Withdrawal dated on or before the end of the fourth week of the semester . . . . .	25%
Withdrawal dated after the fourth week of the semester . . . . .	None
2. Partial withdrawal: If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
4. Summer Sessions: In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days following the scheduled registration day. No refund will be made for courses dropped thereafter.
5. Refund schedule for off-campus registration:
 

After the first class meeting but before the third class meeting . . . . .	80%
After the third class meeting but before the fifth class meeting . . . . .	50%
After the fifth class meeting . . . . .	None

No refund will be made for sessions of less than 21 days.

Refund policies of the University are in conformity with guidelines for refunds adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes. Authorization to withdraw and certification for work done will not be given to student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Please note that effective January 1993, the University will initiate a student health fee of \$100.



## FINANCIAL AID

George Washington University offers a program of financial assistance for undergraduate and graduate students. The program of financial assistance for graduate students includes assistantships, fellowships, traineeships, graduate scholarships, research appointments, part-time employment, and loans. Loans and resident assistantships not based on financial need are available. In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade-point average for particular awards and are not financially encumbered by any other University office. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Application and correspondence concerning assistantships, fellowships, traineeships, or graduate scholarships should be sent directly to the dean of the school concerned and addressed to George Washington University, Washington, D.C. 20052. Unless otherwise specified, application and supporting credentials should be submitted no later than February 1 preceding the academic year for which the award is made. Application for admission to graduate study is a prerequisite for consideration.

### Assistantships

**Research Assistantships**—May be available in departments with faculty who are participating in sponsored research.

**Research Scholar Assistantships**—School of Engineering and Applied Science, GW NASA-Langley Joint Institute for the Advancement of Flight Sciences.

**Graduate Teaching Assistantships**—Available to graduate students in master's and doctoral programs in most departments of the University. A graduate teaching assistant receives financial compensation for a designated unit of service to the assistant's major department of instruction. All new graduate teaching assistants must attend an orientation and evaluation program.

**Resident Assistantships**—Available to graduate students in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part-time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Office of Housing and Residence Life.

### Fellowships, Internships, Traineeships, Special Programs

**University Fellowships**—Available to graduate students in master's and doctoral programs in most departments of the University. Fellowships are based on scholarship and each fellow may receive a stipend and or tuition allowance.

**Research Traineeships**—Available under numerous sponsored programs in a number of departments. Currently, the basic medical science departments and the Departments of Psychology and Speech and Hearing offer such programs. Stipends vary; information is available from the departments.

**Other Fellowships, Internships, Traineeships, and Special Programs**—

Abdellatif Abdalla Award  
Achievement Rewards for College Scientists Foundation Fellowship  
Robert A. Aleshire Fellowship Fund

American Association of Collegiate Schools of Business Fellowship  
American Civilization Fellowships  
American Civilization Internships (Smithsonian Institution—  
George Washington University Cooperative Program)  
American Iron and Steel Institute Fellowship  
American Red Cross Fellowships  
Arthur Anderson & Co. Doctoral Fellowship  
Aryamehr Research Fellowships  
Benjamin Banneker Fellowship for Washington Area Studies  
Bell Atlantic Graduate Fellowship  
Business Administration Departmental Fellowships  
Winfield Scott Blaney Fellowship in International Affairs  
Oliver T. Carr, Sr., Memorial Fellowship in Urban and Regional Planning  
Center for Washington Area Studies Fellowship  
Thomas Alva Edison Fellowship  
Elementary Teacher Education Internships  
Ernst & Ernst Grant to Doctoral Candidates in Business or Economics  
Ernst and Whinney Grant to Doctoral Candidates in Accountancy  
Graduate Engineering Honors Fellowship Program  
GW Fellowship for Ph.D. Studies in Government and Business  
Health Services Administration Fellowships  
Norris E. Hekimian Graduate Award  
Industrial Liaison Program Corporate Graduate Student Fellowship  
Richard D. Irwin Doctoral Fellowships  
Marvin L. Kay Fellowship in Finance  
Rita H. Keller Scholarship Fund  
Isabella Osborn King Research Fellowships  
Loula D. Lasker Fellowships in Housing, City Planning, or Urban Renewal  
Loctite Fellowship  
Morris Louis Fellowship in Painting  
George McCandlish Fellowship in American Literature  
Mellon Foundation Fellowships  
Richard E. Merwin Memorial Award  
Minorities in Planning and Related Professions Program  
National Association of Purchasing Management Fellowship  
National Geographic Society Fellowships  
National Historical Publications Commission—George Washington University  
Cooperative Research Fellowships  
National Science Foundation Graduate Fellowships  
Presidential Merit Fellowships  
Public Policy Studies Fellowship  
Resources for the Future, Inc., Fellowship Prize  
Rose Bibliography Internships  
Thomas Bradford Sanders Fellowships  
Scottish Rite Foundation Fellowships  
ServiceMaster Fellowship  
U.S. Office of Education Fellowships  
U.S. Public Health Service Traineeships  
U.S. Public Health Service Traineeships in Comprehensive Health Planning  
Urban Studies Fellowships, Department of Housing and Urban Development  
Urban Transportation Center Fellowship  
Ronald Barbour Weintraub Research Fellowship in Biological Sciences



### Scholarships

American Association of Cost Engineers Scholarship  
 Armed Forces Health Professions Scholarship Program (The Uniformed Services Health Professions Revitalization Act of 1972--Public Law 92-426)  
 Atlantic Research Corporation Scholarship  
 Frederick Albert and Alma Hand Britten Scholarships  
 Emma K. Carr Scholarships  
 Oliver T. Carr, Jr. Scholarship in Urban and Regional Development  
 James Edward Miller Chapman Educational Foundation Scholarship  
 Daewoo Corporation Scholarships  
 Vincent J. DeAngella Scholarship Fund  
 District of Columbia Institute of Certified Public Accountants Scholarship in Accounting  
 Frederick H. Gibbs Scholarship in Health Services Administration  
 Louis E. Giles Memorial Scholarships  
 Leo and Lillian Goodwin Endowment Scholarship  
 Government Career Development Scholarship  
 Government Intern Scholarship  
 Bryce Harlow Foundation Scholarship  
 Hyundai Scholarship Fund  
 Albert A. and Esther C. Jones Scholarship Fund  
 Allen M. Jones Scholarship Fund  
 Myron L. Loe Graduate Student Scholarship  
 Mary and Daniel Loughran Graduate Scholarship  
 Foster G. McGaw Scholarship in Health Services Administration  
 Paul Pearson Scholarship Fund  
 Phi Delta Gamma Scholarship Fund  
 Public Administration Faculty-Alumni Scholarship  
 Mildred Shott Scholarship Fund  
 Voorhees Scholarships  
 Wolcott Foundation Scholarships  
 Helen and Sergius Yacobson Graduate Scholarship

### Sponsored Awards for Graduate Study

Information regarding awards sponsored by foundations, professional and learned societies, industries, and others that may be used in support of graduate study is available at the Gelman Library, 2130 H St., N.W., first floor. Information is also available on distinguished programs, such as the Rhodes, Marshall, National Science Foundation, Fulbright, and Luce, as well as many others.

### Loan Funds

The following loan funds are available to degree students. A separate application must be submitted for each loan program. Applications for the Perkins Loan Program should be filed no later than April 1 for the following academic year. Complete information is contained in the student financial aid pamphlet, which is available from the Office of Student Financial Assistance, George Washington University, Washington, D.C. 20052.

American Medical Association Nursing Home Administration Loan Fund  
 George F. Henigan Loan Fund  
 Inner-City Student Loan Fund  
 International Student Loan Fund  
 Jeanne Jacobs Student Loan Fund  
 W. K. Kellogg Foundation Hospital Administration Loan Fund

Jessie B. Martin Loan Fund  
 Perkins Loan Program  
 Barney Plotnick, M.D., Student Loan Fund  
 Hiram Miller Stout Memorial Loan Fund  
 University Student Emergency Loan Fund  
 Edmund W. Dreyfuss Loan Fund  
 Peter and Doris Firsht Loan Fund

**Stafford Loans**—George Washington University is an eligible participant in the Stafford Loan Program. Graduate students may apply for a maximum of \$7,500 per year. Students who intend to use the loan for payment of tuition at registration should submit an application, as well as all required supporting documents, no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

**PLUS SLS Loan Program**—George Washington University is also an eligible participant in the PLUS SLS program. The interest rate on the loans is variable based on the interest rate on U.S. Treasury bills, to a maximum of 12%. Repayment begins 60 days after the disbursement of the check. Parents of dependent students may apply for up to \$4,000 per year for each student. Independent students may apply for up to \$4,000 per year on their own behalf. Students who intend to use the loan for payment of tuition at registration should submit an application no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

**The CONSERN Loan Program**, jointly sponsored by the District of Columbia and the Consortium of Universities of the Washington Metropolitan Area, provides supplementary aid to creditworthy students and parents who have financial need remaining after having exhausted benefits from all other federal, state, and institutional aid programs for which they qualify (except CWSP, PLUS SLS, and HEAL). Applicants must be enrolled at least half time and must demonstrate financial need otherwise unmet. CONSERN loans range from \$2,000 up to the cost of education for the academic year and carry a variable interest rate.

### Student Employment

The University participates in the College Work-Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. In addition, the Career and Cooperative Education Center maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Center for interviews and referrals to positions for which they are qualified.

### International Students

Limited awards for graduate teaching assistantships and University fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned.

International students applying for graduate teaching assistantships must have minimum scores of 570 on the Test of English as a Foreign Language (listening comprehension) and 250 on the Test of Spoken English. International students applying from outside the University may be appointed to graduate teaching assistantships but must attend a five-day orientation and evaluation program held prior to registration. Those found to have difficulties with English will be required to enroll in specified courses in English as a Foreign Language (tuition fees for these courses will be waived) and will be assigned non-teaching duties in place of classroom instruction. Such students will be reevaluated at the end of one academic year; if they are not designated as qualified to give classroom instruction, the teaching assistantship will not be renewed.



Graduate students who are presently enrolled at GW and have been proposed as candidates for graduate teaching assistantships by their departments must pass the Test of English as a Foreign Language at the levels indicated above and will be required to complete successfully the English for International Students oral interview and the orientation and evaluation program before they will be considered for graduate teaching assistantships.

For further information on requirements for international teaching assistants, contact the director of the University Teaching Center.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September-May) was \$21,440 in 1990-1991 and will be substantially higher in 1991-1992; generally speaking, expenses for international students are about \$2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

#### **Veterans Benefits**

The Veterans Benefits office assists students entitled to educational benefits as active-duty personnel, veterans, or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting applications to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and that includes other information of general interest.

## PRIZES

**Accountancy Prizes**—Three prizes for academic excellence awarded annually by the Department of Accountancy—one at the undergraduate level, one at the Master of Accountancy level, and one at the Master of Taxation level.

**Elizabeth B. Adams Prize**—Awarded annually by the Department of Management Science to a graduating student for outstanding performance in the field of information systems management. The recipient is selected on the basis of scholarship, leadership within the Department, contributions to the University and service to the community.

**Morris M. Aein Memorial Prize**—Awarded to a deserving student for excellence in drawing.

**American Institute of Certified Planners Outstanding Student Prize**—Awarded to a qualified candidate for the Master of Urban and Regional Planning who has demonstrated significant service to the community, University and Department, or professional planning community.

**William C. Barbee Prize**—Awarded to a deserving student for excellence in sculpture and sculptural ceramics.

**Sylvia L. Bunting Prize**—Awarded annually to a graduate student in the field of biology or zoology.

**Astere E. Claeysens Prize**—Established in 1981 by the Trustees of the Bess and Arthur Dick Family Foundation. It is awarded for the best original work in playwriting by a student enrolled in the University.

**Bertice Cornish Prize**—Awarded annually to an outstanding student completing a graduate program in special education.

**John Henry Cowles Prizes**—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Free-masonry, Southern Jurisdiction of the United States of America. Awarded upon graduation to the graduate or undergraduate student with the best overall scholastic achievement and leadership potential in the School of Business and Public Management in the Elliott School of International Affairs.

**Elliott School of International Affairs Alumni Association Prize**—May be awarded annually to a graduate of the Elliott School of International Affairs (graduate or undergraduate degree recipient) who, in the opinion of the Dean and the Faculty, deserves recognition for academic achievement and contribution to the life of the George Washington University and its programs and goals.

**Harmon Choral Prize**—Awarded annually for significant musical accomplishment and outstanding contribution to the choral program.

**Ching-Yao Hsieh Prize**—Two prizes awarded annually, one to an undergraduate and one to a graduate student in the Department of Economics.

**Cecille R. Hunt Prize**—Offered annually to deserving art students and awarded two or three years to participants in the University's Art Alumni Exhibition.

**International Business Prize**—Two prizes awarded annually by the School of Business and Public Management to students specializing in international business, one awarded to a graduating senior and one awarded to a graduate student.

**Elmer Louis Kayser Prize**—Established by Paul and Elizabeth Rutheser. Awarded annually by the Department of History for the best thesis in history submitted by a candidate for the degree of Master of Arts.

**David Lloyd Kreeger Prizes in Art**—Eight prizes given by Mr. Kreeger, six in the fine arts and two in art history (including museology). Fine arts prizes are awarded to a senior or graduate student in painting, sculpture, printmaking, ceramics, photography, and visual communication. One prize in art history is awarded to a senior and one to a graduate student. Candidates for the prizes must



submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

**Minna Mirin Kullback Memorial Prize**—Established in 1968 by Solomon Kullback in memory of his wife. Awarded annually by a committee of faculty members of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 credit hours of statistics courses by the end of the spring semester.

**Martin Mahler Prize in Materials Testing**—Awarded to the upper-division or graduate student in engineering who submits the best reports on tests in the materials laboratory course, with preference given to prestressed concrete tests.

**Barry Mamlow Endowed Prize in Music**—Established in 1983. Awarded annually to a student majoring in music. The award is made on the basis of academic performance and musical ability, as determined by a committee of faculty appointed by the chair of the Music Department.

**Vivian Nellis Memorial Prize**—Awarded to a student in the English Department who has shown special promise in the field of creative writing.

**Phi Delta Kappa Research Prize**—Awarded annually by the George Washington University Chapter to a graduate student, for an outstanding research project.

**Psi Chi Prizes**—Two prizes awarded annually by the George Washington University Chapter to the best undergraduate student in experimental psychology and to the M.A. degree candidate or second-year graduate student submitting the best thesis or research project in psychology.

**Public Administration Prize**—Awarded by the Department of Public Administration to the outstanding graduating student in public administration on the basis of scholarship, leadership, and service to the University.

**Riggs Trust Award**—Established by Francis J. Lyons, Vice-Chairman of the Board, Riggs National Bank, for the best graduate research paper in Business Administration 223, Investment Analysis and Portfolio Management.

**The Jack and Anne Ryan Award in Health Services Administration**—Awarded annually to that health services administration student who displays excellence of analysis and writing skills in the preparation of a paper on a topic in health services administration.

**Howard C. Sacks Prize**—Awarded to a student in political science who has demonstrated outstanding academic achievement in the study of Far Eastern affairs.

**Julian H. Singman Prizes**—Two prizes awarded annually, one in design and one in aquarelle painting.

**Society of Colonial Wars in the District of Columbia Prize**—A cash prize awarded to a candidate for a graduate degree who, in the judgment of the faculty of the Department of History, submits a thesis or dissertation demonstrating excellence in historical research in American Colonial history. The University reserves the right to withhold the award if no thesis or dissertation attaining the required degree of excellence is submitted.

**Alfred E. Steck Memorial Prize**—Awarded for proven excellence in the field of sculpture.

**Charles Clinton Swisher Historical Club Prize**—Established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Swisher. Awarded annually to the student who submits the best essay covering some phase of medieval history.

**James H. Taylor Graduate Mathematics Prize**—Established in memory of James H. Taylor, former Professor of Mathematics at the University. Awarded annually to a graduate student for outstanding performance in mathematics.

**Geza Teleki Prize**—Awarded for outstanding work in the geological sciences.

**Patricia M. Toel Memorial Prize**—Awarded annually to a graduate student in photography to recognize outstanding achievement.

**Benjamin D. Van Evera Memorial Prize**—Awarded annually to that Graduate Teaching Fellow in Chemistry selected as the most effective teacher during the current academic year.

**Thomas F. Walsh Prize**—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

**Elizabeth Reed Ward Award**—Established by the finance faculty of the Business Administration Department in honor and memory of Elizabeth Reed Ward, who was a teaching assistant in finance. The award is to be made to an outstanding teaching assistant in the finance program.

**Alexander Wilbourne Weddell Prize**—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a degree candidate who writes the best essay on "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

**W.T. Woodson Prize**—Awarded annually to a graduate student demonstrating outstanding achievement in educational administration in the School of Education and Human Development.



## UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will not be eligible (except by special action of the faculty) for subsequent registration at the University.

### Registration

Information on registration procedures is stated in the *Schedule of Classes* which is available in advance of each semester.

Registration in on-campus courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as to students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the college, school, or division in which they are registered in this University. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until financial obligations have been met.



### **Eligibility for Registration**

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of Continuing Education when space is needed for degree candidates.

**New Student**—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered in the University who was not registered on campus during the preceding semester must apply for and be granted readmission by the appropriate admitting office before he or she is eligible for registration.

**Continuing Student**—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

### **Completion of Registration**

Registration is not complete until financial obligations have been fulfilled. Attendance in class is not permitted until registration has been completed.

### **Program Adjustment (Add/Drop)**

The program adjustment period begins the first day of classes. Program adjustment requires the approval of an advisor.

### **Registration for Consortium Courses**

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

### **Student Status**

For the purpose of defining student status, graduates taking 9 or more credit hours are considered to be full-time students. All other graduate students are considered to be part time.

### **Attendance**

Students may attend only those classes for which they are registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

### **Scholarship Requirements**

Students who fail to maintain the scholarship requirements of the college, school, or division in which registered may be dismissed from the University.

### **Grades**

Grades are mailed to students through the Office of the Registrar at the close of each semester. They are not given out by instructors or released over the telephone. The following grading system is used: A, Excellent; B, Good; C, Minimum

Pass: CR, Credit; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal. Except for courses that specifically state the repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of C or above was received, unless required to do so by the department concerned. A written statement to this effect must be submitted to the student's dean by the appropriate department chair.

### **Incomplete/Authorized Withdrawal**

When another grade has not been assigned, the symbol I (Incomplete), the symbol W (Authorized Withdrawal), or the symbol Z (Unauthorized Withdrawal) will be recorded. The symbol I indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of I may be recorded if the student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of Z is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

### **Changing a Grade of Incomplete**

For information concerning changing a grade of Incomplete, consult the regulations of the college, school, or division concerned.

### **The Grade-Point Average**

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: A, four points; B, three points; C, two points; F, no points, for each credit hour for which the student has registered in the degree program. Courses marked CR, I, IP, P, NP, W, or Z are not considered in determining the average, except that courses marked I will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

### **Final Examinations**

Final examinations for graduate-level courses are scheduled, if desired, by the individual department or instructor.

### **Academic Dishonesty**

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. In particular, students have a special responsibility to acquaint themselves with, and to use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the necessary academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty.



Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

### Student Conduct

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained at the office of Judicial Affairs. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### Withdrawal

Withdrawal from a course or from the University requires the permission of the dean of the college, school, or division in which the student is registered. A grade of W will be recorded on the student's academic record. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see Payment of Fees).

Each college, school, and division of the University sets deadline dates for each semester concerning withdrawal. Withdrawal between these dates and the end of the semester is permitted only in exceptional circumstances.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations. Unauthorized withdrawal will result in the recording of a grade of Z for the course or courses.

### Changes in Program of Study

**Changes Within a School or Division**—A student may not substitute one course for another, drop courses (see Withdrawal, above), or change status from credit to audit or from audit to credit without the approval of the dean of the school or division in which registered. Change from one section to another of the same course may be made with the approval of the dean and the department concerned. Change from one major field to another within the same school may be made with the approval of the dean.

**Transfer Within the University**—Application for transfer to another college, school, or division must be made to the appropriate admitting office on the form provided by the office concerned.

### Credit

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the college, school, or division concerned.

**Auditing**—A person who has been admitted to the University may be registered with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A

student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.

#### **Post-Admission Transfer Credit**

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

#### **Transcripts of Record**

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. A fee of \$3 is charged for each transcript. **Partial transcripts are not issued.**

#### **Continuous Enrollment**

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below) or be assigned by the dean to inactive status (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

#### **Leave of Absence**

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use University facilities is suspended while the leave is in effect.

#### **Inactive Status**

Under the regulations established by each school and college, a student may be considered in continuous pursuit of the degree while not enrolled in courses at the University when engaged in the following: cooperative engineering work; semester, study abroad program; attendance at another institution with dean's approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete was received; or non-course instructional activities unique to the particular school or college.

Students must request to be enrolled in inactive status, in advance of the semester or semester concerned, and be granted approval by their dean for the specific activity desired. This status is generally limited to one year; no fees are assessed to students while in this status.

#### **Graduation Requirements**

Degrees are conferred in February, May, and September.

To be recommended by the faculty for graduation a student must have met the admission requirements of the college or school in which registered, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which registered, filed an application for graduation prior to the published deadline date, and be free from all indebtedness to the University.



**Enrollment is required for the semester or summer session at the close of which the degree is to be conferred.**

**Application for Graduation**—An Application for Graduation form must be filed at the time of registration for the last semester or summer session of the senior or final year. Students completing degree requirements during the summer sessions will be awarded diplomas (no formal convocation) dated September 30, provided they have completed all degree requirements and have applied for graduation as a part of registration for the summer sessions.

**Scholarship**—The student must meet the scholarship requirements for the particular degree for which registered.

**Curriculum**—Minimum curriculum requirements for each degree are stated under the college or school offering work in preparation for the degree.

**Residence**—The graduate student must meet the residence requirements for the particular degree for which registered.

**Thesis or Dissertation**—A thesis or dissertation submitted in partial fulfillment of requirements for a degree must be presented in its final form to the dean of the college or school concerned no later than the date specified in the University Calendar. Accepted theses and dissertations, with accompanying drawings, become the property of the University and are deposited in the University's Gelman Library, where the duplicate copies are bound and made available for circulation. See the appropriate college or school in this Bulletin for regulations governing theses and dissertations.

#### **The Library**

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use.

The loan period for stack books is 21 days. Any book that circulates is subject to recall by the library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

#### **Right to Dismiss Students**

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

#### **Right to Change Rules**

The University and its college, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

#### **Right to Make Changes in Programs**

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

#### **University Policy on the Release of Student Information**

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained

by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance; school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

#### **Property Responsibility**

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the Security Office.

#### **University Policy on Drugs**

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.



## STUDENT SERVICES

### Office of the Dean of Students

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, and assists in nonacademic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office.

### Housing

The University does not provide residence hall space for graduate students. However, The Housing and Residence Life Office refers graduate students to apartments as they become available in University-owned buildings in the campus area. Additionally, the University's Off-Campus Housing Resource Center, located in the Marvin Center, can provide information and assistance for those seeking accommodations.

### Food Service

Contract food service is available from August to May, based on the academic calendar of registration, exams, and vacation periods. Rates for the various meal plans are available from the Housing and Residence Life Office. Contract service is cafeteria style and provided in two residence halls and the Cloyd Heck Marvin Center. Meal coupons may also be used on a cash-equivalency basis in the cafeteria on the first floor of the Marvin Center and in George's on the fifth floor.

Students who observe the Jewish dietary laws can write to make arrangements with the GW Housing and Residence Life Office regarding the B'nai B'rith Hillel Foundation Kosher Meal Plan.

### Student Health Service

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be arranged by appointment or, during certain hours, secured on a walk-in basis. Many routine lab tests may be performed in the Health Service lab at cost; allergy shots, immunizations, and various lab tests are done at little or no charge. Psychiatric evaluation, crisis intervention, and short-term therapy are available by appointment.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Engineering Education Program are not eligible. The fees incurred from all services rendered outside of the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

### Health and Accident Insurance

The University has arranged for and endorsed group health and accident insurance, on an elective basis, for all students. Interested students should contact the Student Health Service or Office of the Dean of Students.

### **Counseling Center**

The Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their educational goals. Services include (1) short-term individual counseling, art therapy, crisis intervention, and referral services for personal problems (e.g., academic pressures, relationship or family difficulties); (2) group counseling for personal problems; (3) educational/vocational counseling and testing; (4) workshops designed to address academic or personal development (e.g., test-taking strategies, study skills, communication skills, stress management); (5) consultation with faculty, staff, and student groups about their special needs in designing programs to improve the campus environment.

The Center administers the Miller Analogies Test, GW admissions tests, and special assessments for business and industry. Career counseling and referral services are available to GW faculty, staff, alumni, and individuals from the greater Washington community.

Disabled students are asked to call ahead so that arrangements can be made to adapt services or to meet at an accessible site.

### **The Reading Center**

The Reading Center offers individual assessment and programming services for the preschool through adult years, emphasizing improvement in all areas of literacy development.

### **The Speech and Hearing Center**

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

### **The Writing Center**

The Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

### **Computer Information and Resource Center**

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM-PC, Apple Macintosh, and IBM mainframe computers. The CIRC computer laboratories are open seven days a week, 24 hours a day during the academic year and all day and evening at all other times. CIRC maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session.

In cooperation with the Gelman Library, GW Television, and Telecommunications Services, CIRC publishes a periodic newsletter on computing issues.



gives seminars and offers technical advice to faculty and students regarding use of the IBM mainframe, IBM personal computers, Apple Macintosh personal computers, and the GW Data Network. Students and faculty may receive assistance from CIRC for microcomputer selection and acquisition. CIRC administers and can make recommendations on various discount-purchase programs for microcomputer equipment.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

### **Career and Cooperative Education Center**

The Career and Cooperative Education Center provides career planning and job-seeking assistance as well as a cooperative education program to students and alumni. Services include full-time and part-time job listings, career consulting, workshops (e.g., organizing job searches, resume and letter writing, effective interviewing); a resource library of career field and employer literature; on-campus interviews for students within one year of graduation; a resume referral service; resume critiques; a call-in job listings service; and a credentials service that supports employment and graduate/professional school applications.

### **International Services Office**

International students, scholars, faculty, and staff are provided assistance through the International Services Office. The staff offers advising and counseling for a variety of personal problems, including cultural adjustment, living conditions, budgets, academic concerns, and financial aid; immigration assistance and information on government requirements and regulations specific to the international community; and orientation programs to help with adjustment to living and studying in the United States.

### **Disabled Student Services**

The Disabled Student Services office works to assure that the special services necessary for disabled students to participate fully in their academic programs and the extracurricular life of the campus are provided for them through University or community resources.

### **Multicultural Student Services Center**

The Multicultural Student Services Center provides academic, co-curricular, and personal support services for all GW minority students to enhance minority student life at GW. Through the Center, minority students receive orientation to the various University resources, and are made aware of the many cultural activities and programs that exist on campus and in the greater metropolitan area. The Center provides professional and peer counseling, course advising, personal services, and campus and community mentoring programs. The staff is available to address students' academic and personal concerns. In addition, the Center enhances the quality of ethnic minority student life through the sponsoring of co-curricular activities, leadership training, and a periodic newsletter. The Center houses a resource center with computers for student use, reference books and instructional materials, a test file, and an information center. The Multicultural Student Services Center oversees the programs. Opportunity Program and various preparatory and precollege

### **Office of Campus Life**

The Office of Campus Life offers programs, services, and facilities that provide opportunities for personal, professional, social, and cultural development. The Office of Campus Life includes the Campus Activities Office, Cloyd Heck Marvin

Center, and New Student Programs and Services. Staff members assist individual students, campus organizations, and the University community with event planning, program coordination, and participation in special projects. The staff also help in interpreting University policies and procedures that affect campus activities. Additional information about the services offered by the Office of Campus Life, and about the various student organizations and committees, can be obtained from the *Student Handbook*.

### **Campus Activities Office**

The Campus Activities Office provides administrative support to the University Program Board and other groups planning major events. Other services include advisement of campus organizations (including fraternities and sororities), registration of student organizations, leadership training, and planning and coordination of major campus events.

**Program Board**—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

**Student Government**—The George Washington University Student Association is comprised of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services to students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and colleges, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

**Student Organizations**—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 200 registered organizations on campus, covering a broad spectrum of interests including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as fraternities and sororities.

### **The Cloyd Heck Marvin Center**

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes five dining locations, lounges, recreational facilities, a theatre, study rooms, conference meeting rooms, the Off-Campus Housing Resource Center, the Information Center, and a typing/microcomputer center. The Marvin Center provides facilities for programs conducted by the University Program Board, by the academic departments that include the performing arts, and by other University organizations.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.



## Religious Life

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling. Religious services and special observances are also provided for the University community as announced.

## Major Program Events

**Art Exhibits**—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade gallery of the Marvin Center. Student art exhibits are presented each semester.

**Concert Series**—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

**Dance**—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

**Glee Club, Jazz Band, and Orchestra**—The University Glee Club, Jazz Band, and Orchestra are available to students either as credit courses or as cocurricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

**International Programs**—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

**Program Board**—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

**Theatre**—The University Theatre produces four or five major plays and musicals during the year on the proscenium thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

## Department of Athletics and Recreation

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; wrestling, gymnastic, and weight rooms; handball and squash courts; and a sauna and lockers. Based in the Smith Center, the Department of Athletics and Recreation offers a broad program of intramural and recreational activities designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association and the Atlantic Ten Conference. Its women's and men's intercollegiate varsity teams compete against major universities throughout the Midwest and Eastern Seaboard in such sports as basketball, baseball, soccer, tennis, golf, wrestling, crew, swimming and diving, water polo, badminton, volleyball, and gymnastics.

## GRADUATE SCHOOL OF ARTS AND SCIENCES

Acting Dean R.W. Kenny

Associate Dean E.A. Caress

Assistant Deans A.D. Andrews, D.A. Rowley, C.E. Rice

### Introduction

The Graduate School of Arts and Sciences is responsible for advanced study and research leading to master's degrees in the arts and sciences and the degree of Doctor of Philosophy. Graduate programs at George Washington University were first formally organized under the Graduate School in 1905, following several decades of gradual growth in a number of departments.

All graduate programs in the arts and sciences leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, Master of Science in Forensic Science, and Doctor of Philosophy are under the Graduate School. In addition, a Master of Philosophy degree is awarded by the School, upon recommendation of the appropriate department, to students who have successfully completed the first unit for the Doctor of Philosophy degree.

The School is under the direction of the Graduate Faculty of Arts and Sciences. It is the responsibility of the Faculty to set the requirements for admission to the School, to provide courses and programs of study and research for its students, to establish academic standards for its degrees, to recommend to the Board of Trustees the awarding of degrees, to promulgate regulations as needed for the operation of the School, and generally to supervise its activities.

The administration of the School is vested in the dean, who is chairman of the Dean's Council, which is responsible to the Faculty of the School for all personnel matters.

### Admission Requirements

Application forms for admission to graduate study are obtained from the office of the dean of the Graduate School of Arts and Sciences. When completed, these application forms must be submitted to this office, together with college transcripts, scores on the Graduate Record Examination, letters of reference, and other information as required by the department or program. All application materials become the property of the Graduate School and will not be returned. Original materials must be submitted; facsimile copies will not be accepted. Admission is dependent on departmental recommendation and approval by the dean.

Applicants must have academic backgrounds of excellence, usually with majors, or equivalent, in the fields in which they intend to study for advanced degrees. Normally, a B average (or equivalent) from an accredited college is required. With evidence of special promise, such as high Graduate Record Examination scores, an applicant whose academic record falls short of a B average may be accepted as a probationary student. The minimum does not assure automatic acceptance. The departments may, and often do, set higher admission standards. Moreover, the number of spaces available for new graduate students limits the number that can be accepted. Students who apply in the senior year must have completed their baccalaureate work before registration at the Graduate School and must present evidence of such completion.

All applicants are required to submit scores on the GRE general test. In addition, some programs require scores on a GRE subject test (see the Departmental Requirements section of the application package). The applicant must be



the Educational Testing Service send the required score reports directly to the Graduate School of Arts and Sciences. GRE scores are valid for five years only.

The following additional requirements pertain to all applicants from countries in which English is not an official language:

a. Applicants are required to submit scores from the Test of English as a Foreign Language (TOEFL). The Test of Written English (TWE) is also recommended. The recommended minimum TOEFL score for admission to a graduate degree program is 550.

b. Applicants for graduate teaching assistantships are required to submit scores on the TOEFL and the Test of Spoken English (TSE). To be considered for an assistantship, the applicant must have minimum scores of 570 on the TOEFL (55 in listening comprehension) and 250 on the TSE.

c. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at George Washington University before registering. (Those who score 600 or more on the TOEFL and score 5 out of 6 on the TWE are exempted.) EFL course work may be required, depending on the applicant's performance on the placement test.

**Application for Admission**—Applicants who are requesting fellowship support must submit completed applications by the dates indicated on the Graduate School's application information. Completed applications for graduate study without fellowship support must be received by July 1 for the fall semester, by November 1 for the spring semester, and by April 15 for the summer sessions, unless otherwise noted on the Graduate School's application information. International students must submit the completed application by June 1 for the fall semester and by October 15 for the spring semester unless otherwise noted on the application information.

**Readmission**—A student who wishes to resume a graduate program that had been interrupted must file an application form to be considered for readmission. Readmission is not guaranteed, and the application is subject to review by the department concerned and the dean. The student may be required to take qualifying examinations on the course work completed. Application forms are available in the Graduate School Office.

## Regulations

See Fees and Financial Regulations; University Regulations.

In addition, the Graduate School publishes a Student Handbook each academic year which contains updated information on the School's policies, regulations, and other matters of concern to enrolled or admitted students. It is the responsibility of the student to be aware of the information contained in this Bulletin and the Handbook.

## Grades

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; CR, Credit; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal.

The grade of I indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. The incomplete must be made up before the lapse of one calendar year. An Incomplete for regular course work that is not changed within one calendar year remains permanently as a grade of I on the student's record. The grade of I cannot be removed by reregistering for the course here or by taking its equivalent elsewhere.

The grade of IP is given for all thesis and dissertation research courses until the thesis or dissertation is completed. Upon the satisfactory completion of the thesis or dissertation, the grade IP is changed to CR automatically. The grade of CR may be given for Advanced Reading and Research courses.

### Scholarship Requirements

Graduate students are required to maintain a minimum cumulative grade average of B (3.00) in all course work taken following admission to the Graduate School. Individual departments may require a higher average. The Department of English requires a 3.25 average. Only graduate course work taken at the University that forms part of the student's program of study may be included in the cumulative grade average.

In the case of a student who receives a grade of F for a course in the program of studies, the Graduate School will require a written statement from the department justifying the student's continuance in the Graduate School and outlining the program to be followed. Continuation is contingent upon the dean's approval. When a grade of F is received for a course in the program of studies, the grade is included in the student's grade point average whether or not the course is repeated.

A student may repeat a course in which a grade of C or above was received only when permitted to do so by the department concerned, unless the course description states that the course may be repeated for credit. A written statement to this effect must be submitted for approval to the dean's office by the appropriate departmental advisor. It is then filed with the Registrar. If a course is repeated, the first grade received remains on the student's record and is included in the student's grade point average.

A graduate student may take an advanced undergraduate course (course numbered 101-200) for graduate credit only upon the approval of the dean and the department at the time of registration. Such approval is granted only with the provision that the student complete additional work in order to receive graduate credit.

### Program of Studies

The program of studies is a formal statement of the requirements to be met in completing a specific degree program as well as the dates by which each requirement must be completed. The program of studies form is obtained from the Graduate School at the time of the first registration. It must be completed in consultation with the departmental advisor and submitted for approval to the Graduate School by the indicated date. A master's candidate's program of studies is due during the first semester of study, and a Ph.D. candidate's program of studies is due during the second semester of study. A program of studies may be revised, when necessary, by obtaining the approval of the departmental advisor and the dean. The revision must be filed in the Graduate School office. A completed course cannot be dropped from the program of studies unless the inclusion was due to an error in advising or an administrative error. Such a change in the program requires the approval of the dean.

**Probationary Students**—It is especially important for those admitted as probationary students to consult with their departmental advisor as early as possible regarding completion of additional requirements specified in the letter of admission. The exact conditions for admission of probationary students must be satisfied.

**Academic Work Load**—Full-time students register for 9 to 12 credit hours each semester; part-time students must register for 6 credit hours each semester. Students who work more than 20 hours per week must be part-time students. These requirements do not apply to students who have fewer than 9 credit hours (full time) or 6 credit hours (part time) remaining to complete their programs. Students who are employed more than 20 hours per week are expected to apply for part-time academic programs, and they will not be permitted to register for more than 6 credit hours in any semester.



### Continuous Enrollment

All students must be continuously enrolled while working toward a degree, except during the summer sessions. Students who have completed all course work, thesis, and dissertation registration requirements and are within their program of studies deadline must register for continuous enrollment each semester during the registration period. If continuous enrollment is not maintained, the student is dropped from the degree program unless a leave of absence is granted by the Graduate School.

### Leave of Absence

A student who, for personal reasons, is temporarily unable to continue the program of studies may request leave of absence for a specific period of time, not to exceed one calendar year during the total period of degree candidacy. When the period of leave has expired, it is the student's responsibility to register for the next semester. If a student fails to register, degree candidacy is terminated.

### Withdrawal

Graduate students who intend to withdraw from the Graduate School should inform the School in writing. The last day for complete withdrawal without academic penalty is at the end of the eighth week of classes.

### Graduation Requirements

All students must file an Application for Graduation by the date indicated in the University Calendar for the semester or summer session in which they intend to graduate. Students must be registered in the Graduate School during the semester they plan to graduate. Degree candidates may graduate in May, February, or September. Students who have completed the requirements for a degree but have not yet been awarded the degree will be issued a letter to this effect upon request.

### Degrees

Listed below are the degree programs of the Graduate School of Arts and Sciences and the specific degrees offered, by field. The programs are directed by the departments concerned. Degree programs that bridge two or more departments are directed by committees composed of members of the departments concerned. For further information write to the dean or the chairman of the appropriate department. Students with special academic goals may pursue individualized programs of study toward the Master of Arts or Master of Science, subject to approval by the Committee on Individual Programs and the dean.

### Graduate Fields

The graduate course work offered in support of the degree programs in the following list is shown by department in this Bulletin.

#### Humanities

American Civilization  
American Literature

Art  
Ceramics  
Design  
Painting  
Photography  
Printmaking  
Sculpture  
Visual Communication

#### Degrees Offered

M.A.	Ph.D.
M.A.	Ph.D.
M.F.A.	

Art History	M.A.	Ph.D.
English Literature	M.A.	Ph.D.
Museum Studies	M.A.	
Music	M.A.	
Music (Performance)	M.Mus.	
Religion	M.A.	
Theatre	M.F.A.	
Women's Studies	M.A.	

**Social Sciences**

Administrative Sciences	M.A., M.S.	
Anthropology	M.A.	
Criminal Justice	M.A.	
Economics	M.A.	Ph.D.
Geography	M.A.	
History	M.A.	Ph.D.
Legislative Affairs	M.A.	
Political Science	M.A.	Ph.D.
Public Policy	M.A.	Ph.D.
Sociology	M.A.	Ph.D.
Telecommunication	M.A.	

**Physical and Mathematical Sciences**

Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Chemical Toxicology	M.S.	
Chemistry	M.S.	Ph.D.
Environmental Science	M.S.	
Forensic Sciences	M.F.S., M.S.F.S.	
Geobiology	M.S.	Ph.D.
Geochemistry	M.S.	Ph.D.
Geology	M.S.	Ph.D.
Mathematical Statistics	M.A.	
Mathematics	M.A.	Ph.D.
Physics	M.A.	Ph.D.
Statistical Computing	M.S.	
Statistics		Ph.D.

**Biomedical and Related Sciences**

Anatomy		Ph.D.
Art Therapy	M.A.	
Biochemistry	M.S.	Ph.D.
Biological Sciences	M.S.	Ph.D.
Biology		
Botany		
Zoology		
Clinical Microbiology	M.S.	
Genetics	M.S.	Ph.D.
Microbiology	M.S.	Ph.D.
Pathology		Ph.D.
Pharmacology	M.S.	Ph.D.
Psychology	M.A.	Ph.D.
Radiological Sciences		Ph.D.
Speech-Language Pathology and Audiology	M.A.	

**Joint Master of Science-Doctor of Medicine Program**

Students interested in the joint Master of Science and Doctor of Medicine program must meet the requirements for admission to the Graduate School of Arts and Sciences and to the Doctor of Medicine degree program of the School of Medicine and Health Sciences.



The Master of Science program consists of a minimum of 30 hours of credit. A maximum of 12 hours of credit for graduate-level courses completed as a part of the Doctor of Medicine degree curriculum (and not already applied toward the bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 credit hours of work, which in most programs includes a thesis, must be work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

#### **Joint Master's--Juris Doctor Program**

Students interested in working concurrently toward the Juris Doctor degree in the National Law Center and a master's degree in the Graduate School of Arts and Sciences must meet the requirements for admission to both schools and all requirements in each degree program. It is possible for a student to complete work for both degree programs within four years.

#### **Joint Doctor of Medicine--Doctor of Philosophy Program**

A joint program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements that must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and the Graduate School of Arts and Sciences.

A student working toward these degrees may apply a maximum of 24 credit hours of approved course work in the School of Medicine and Health Sciences toward the minimum of 48 hours of course work required to qualify for the General or Cumulative Examination for doctoral candidacy. This course work is normally taken during the semesters that alternate with the medical program and in the years following the award of the M.D. degree. The student's research for the dissertation may begin concurrently with the final 24 credit hours of graduate course work leading to the General or Cumulative Examination. The estimated time for the completion of this dual program is six years.

In order to enter the joint program, a prospective student must first apply for and gain admission to both the Graduate School of Arts and Sciences and the School of Medicine and Health Sciences separately through established procedures. Upon admission to both schools, the student may then apply for affiliation with the joint program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a departmental doctoral committee.

#### **Requirements for the Degrees**

##### **The Master's Programs**

Unless otherwise specified, the requirements listed below are applicable to candidates for the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Music, Master of Science, and Master of Science in Forensic Science.

1. **General Requirements**—For a master's degree program including a thesis, the satisfactory completion of a minimum of 30 credit hours of approved graduate work, including 6 credit hours of thesis research, is required. For a master's degree program that does not include a thesis, the number of credit hours of approved graduate course work is determined by the department and normally consists of from 30 to 36 credit hours. The program without the thesis is not an individual student option and is not available in every department. Departments can and often do set requirements above the minimum required by the Graduate School.

Work taken to make up deficiencies is never counted as part of the requirements leading to a master's degree. Upon approval, up to one-half of the required graduate work may be taken in courses offered by the other affiliated institutions of the Consortium of Universities of the Washington Metropolitan Area, Inc., or by another degree-granting division of this University. If credit is transferred from another institution (see Transfer of Credit, below), the number of credit hours which may be taken at an affiliated Consortium institution is reduced by the number of hours accepted as transfer credit.

All master's degree candidates must complete degree requirements by the calendar date specified in the program of studies, which in no case will exceed four years. Extensions beyond the specified time period may be granted in exceptional circumstances, but the student will be required to register and pay for 6 credit hours of Reading and Research for audit each semester.

2. *Transfer of Credit*.—A maximum of one-quarter of the credit hours of graduate course work required for a degree may be approved for transfer to the Graduate School from the Division of Continuing Education, another degree-granting division of this University, or another accredited college or university. For a transfer of credit to be approved, all of the following conditions must be met: the course work must have been taken within the two years prior to admission to the Graduate School, it must be approved as part of the student's program of studies, it must not have been applied to the completion of requirements for another degree, it must be post-baccalaureate graduate-level course work, and the student must have received a grade of B or better in each course for which a transfer of credit is requested. This action must be requested in writing and approved by the departmental advisor and the dean. A transcript of the course work must be on file before the request can be considered.

3. *Special Program Requirements*.—Master's degree candidates in some programs must demonstrate a reading knowledge of an appropriate foreign language. In other programs, students must demonstrate competence in quantitative methods, normally by passing prescribed courses in Statistics, Computer, and Information Systems. Other programs have special requirements in other subjects. Courses taken at the undergraduate level to fulfill these requirements may not be counted in the number of graduate credit hours required for these programs. For further information on these and other regulations, consult the Student Handbook and the departments and program faculty concerned.

4. *The Thesis*.—The main purposes of a master's thesis are to demonstrate the student's ability to make independent use of information and training and to furnish objective evidence of constructive powers in a chosen field. The student registers for six credit hours of thesis research and must complete the thesis no later than four calendar years after matriculation as a candidate for the master's degree. Registration for thesis research entitles the student to the advice and direction of the member of the faculty under whom the thesis is to be written. The thesis subject must be approved by the faculty member who will be directing the thesis. A thesis topic approval form must be submitted to the Graduate School upon registration for thesis research. The thesis—in its final form, with one copy and a certificate of approval signed by the thesis director and by at least one departmental reader—must be presented to the dean no later than the date announced in the University Calendar. All theses must meet the form, style and other requirements set forth in a pamphlet, *Information Concerning Master's Theses and Doctoral Dissertations*, available in the Graduate School office.

5. *Master's Comprehensive Examination*.—Most master's degree candidates must pass a Master's Comprehensive Examination in the major subject. Examinations are held on dates fixed by the departments, so that results can be filed in the Graduate School office no later than the day before the faculty meets to approve the list of graduates. The nature and form of the examination is the responsibility of the department or program.



A student who fails to pass the Master's Comprehensive Examination may, with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted.

### **The Doctor of Philosophy Program**

The minimum requirements for the doctoral program are as follows:

1. **General Requirements**—The program leading to the degree of Doctor of Philosophy requires the satisfactory completion of a minimum of 72 credit hours of approved graduate work for entering students whose highest earned degree is a baccalaureate. A minimum of 48 of these hours must be taken in preparation for the General Examination. Entering students whose highest earned degree is a master's degree are required to register for a minimum of 48 credit hours of approved graduate work, no fewer than 24 of which must be taken in preparation for the General Examination. While completing the dissertation portion of the program, the student must register for 12 to 24 credit hours of dissertation research, depending on the number of hours completed prior to the General Examination. The exact number of credit hours required for any part of the total program is assigned by each department and may exceed the minimum required by the Graduate School.

Doctoral degree candidates have an overall eight-year time limit for completion of all degree requirements. Doctoral students in the first unit of their programs shall meet the calendar deadline for completing this unit as specified in the program of studies. Completion of the first unit includes satisfactory completion of course work, special program requirements, and the General Examination. Doctoral students in the second unit of their programs, i.e., dissertation research, shall have an approved topic on file in the Graduate School office by the date specified in the program of studies, which in no case will exceed two years from the completion date of the General Examination. All remaining doctoral degree requirements shall be completed by the date specified in the program of studies, which in no case will exceed five years from the completion date of the General Examination. If any of the deadlines specified above are not met, assuming academic approval for an extension, which may be granted in exceptional circumstances, the student must register and pay for 6 credit hours of Reading and Research for audit each semester. These hours will not be counted toward completion of the degree.

2. **Transfer of Credit**—Entering students who hold a master's degree relevant to the proposed doctoral field of study may request transfer of up to 24 hours of credit toward a doctoral degree for acceptable post-baccalaureate graduate work taken at the master's degree level at George Washington University or another accredited college or university. For those who do not hold the master's degree, a maximum of 24 hours of credit may be transferred, provided the conditions listed under The Master's Programs (Item 2) above are met.

3. **Special Program Requirements**—Certain doctoral programs require a reading knowledge of one or two appropriate foreign languages, or high proficiency in one language. Some require a reading knowledge of one language in addition to competence in quantitative or other subject matter; some require competence in other subject matters without a language requirement. Competence in quantitative methods is normally demonstrated by passing certain prescribed courses in Statistics, Computer and Information Systems. Courses taken at the undergraduate level to fulfill special program requirements may not be counted in the number of graduate credit hours required for the student's doctoral program, except that up to 6 hours of course work at the 100 level may be so counted, with the approval of the department and the dean, so long as the number of hours of dissertation credit in the student's program is 12 or more. For further information

on these and other regulations, consult the Student Handbook and the departments and program faculty concerned.

4. *The General Examination*—Each student is required to complete the General Examination no later than the semester following the completion of course requirements. The General Examination is composed of a written examination five to six hours in length in each of the areas of study comprising the student's total program; the time permitted between each examination is determined by the administering department. Some departments permit one or two areas of study to be "written off"; that is, a special, shorter examination is given after a year of course work in the area. A cumulative examination system is in effect in the fields of chemistry and mathematics; students in these fields should consult the department for information.

A student who fails to pass any part of the General Examination may, in exceptional circumstances, and with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted. The student's degree candidacy will be terminated.

Satisfactory performance on the General Examination is required for admission to the second unit of the Doctor of Philosophy degree program, consisting of the dissertation and final examination. Admittance to the second unit is permitted only if the student's General Examination committee finds that the student's performance on the examination and in course work gives a good indication of success in the second unit. Passing of the examination at the minimum level does not necessarily give this indication.

5. *The Degree of Master of Philosophy*—Upon departmental recommendation and approval of the dean, the degree of Master of Philosophy may be awarded to students who have successfully completed all requirements for the Doctor of Philosophy degree up to and including the General Examination. Not all departments recommend students for this degree.

6. *The Dissertation and Final Examination*—A dissertation is required of each doctoral candidate as evidence of ability to perform scholarly research and interpret its results. The candidate normally enrolls for Dissertation Research upon completion of Unit I; however, the candidate may register for up to 6 credit hours of Dissertation Research during Unit I. If the dissertation is not completed within five years from the date the General Examination is completed, the student will be required to request an extension to continue. If the extension is approved by the department and the dean, the student will be required to register for 6 credit hours of Reading and Research for audit and to retake the General Examination.

When the dissertation has been approved by the director, members of the Dissertation Research Committee, and the dean, the candidate takes the Final Examination, an oral examination that is open to the public. A committee of examiners (composed of Graduate School faculty and, when appropriate, outside scholars) conducts the examination. A sufficient number of copies of the dissertation must be provided by the candidate for the members of the Examination Committee. If the candidate passes, he or she is recommended by the Graduate School for the degree of Doctor of Philosophy.

No later than the date specified in the University Calendar, the candidate must submit to the dean the original and one copy of the dissertation and an abstract for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

Detailed information regarding regulations for the form and reproduction of the dissertation is available in the Graduate School office. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee that is applied toward the expense of printing the Announcement of the Final Examination and the basic service rendered by University Microfilms, Inc.



### Fellowships and Financial Aid

Most departments offer graduate teaching assistantships and University fellowships, and research assistantships are available in some departments. Students should check with their department concerning the availability of assistantships and fellowships. Graduate teaching assistants and University Fellows are appointed by the dean of the Graduate School, based on department recommendations. Other kinds of sponsored and University awards are also available. Awards are based on academic excellence, and only full-time degree candidates in the Graduate School are eligible to be considered. Appointments are made on a year-to-year basis and are not automatically renewable.

Students applying for admission who also wish to apply for a fellowship should submit the fellowship application and a completed application for admission by February 15. Students currently enrolled in the Graduate School should submit the fellowship application by February 15 and should check with their departments concerning additional application requirements.

International students applying for teaching assistantships should refer to Financial Aid. International Students, for regulations governing the appointment of international graduate teaching assistants.

Forms are available at the office of the Graduate School of Arts and Sciences and are included in application for admission packets. Filing the fellowship application entitles the student to consideration for all awards available in the student's department.

Students who wish to apply for loans should indicate their intent to do so on the application for admission. Information concerning loans is contained in a booklet available from the University's Office of Student Financial Assistance.

### Cooperative Programs

The American Studies Program at George Washington University has made a cooperative arrangement with the American Studies Program of the Smithsonian Institution. Members of the staffs of the Smithsonian's American Studies Program, National Museum of American History, National Portrait Gallery, and National Collection of Fine Arts offer seminars and tutorial instruction in fields that provide students with an unusual opportunity to develop new dimensions in the discipline of American civilization. This program of study is open to students working toward the degrees of Master of Arts and Doctor of Philosophy and is intended to prepare them for research, teaching, and museum-related careers.

The Art Department of George Washington University has made arrangements with the Smithsonian Institution to offer graduate programs of study and research in museum studies leading to the degree of Master of Arts in the field of art history with a concentration in museum training. The Department has made similar arrangements with the Corcoran Gallery of Art, the Freer Gallery, the Hirshhorn Museum and Sculpture Garden, the Museum of African Art, the National Museum of American Art, the Phillips Collection, the Renwick Gallery, and the Textile Museum.

For further information concerning these programs, contact one of the following offices at George Washington University: the Graduate School of Arts and Sciences for those who are interested in any of the fields listed above, the Art Department for those interested in art museum training, the American Studies Program for those interested in the field of American civilization.

George Washington University, in cooperation with two other universities and the Folger Shakespeare Library, helped establish the Folger Institute for Renaissance and 18th-Century Studies as a cooperative venture in graduate studies in the humanities. Fifteen universities are now member institutions. Seminars (limited to 12 students each) are offered each semester under the direction of

American and foreign scholars. The Folger Library forms the core of the Institute. All participants enrolled in the seminars are granted access to the collections of rare books, manuscripts, and reference materials of the Library. All registered students are eligible to apply for admission to one or more of the seminars, although priority in enrollment will be accorded graduate students working on dissertations and postdoctoral scholars from the sponsoring institutions. Further information, including a listing of seminar topics, is available at the Folger Shakespeare Library.

### **Center for Washington Area Studies**

The Center for Washington Area Studies serves as the focal point at the University for interdisciplinary work related to Washington and its regional context. Through teaching, advanced research, publications, and public events that include tours, exhibits, and conferences, the Center works to promote a better understanding and appreciation of the history, culture, literature, and public policies of the Washington region.

### **Off-Campus Degree Programs**

The Graduate School of Arts and Sciences is currently offering the following degree programs off campus: the Master of Arts and Master of Science in the field of Administrative Sciences and the Master of Arts in the fields of Criminal Justice, Legislative Affairs, and Telecommunication. Not all of these programs may be available in any given year.



## SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Acting Dean D. Gross

Associate Dean J.E. Feir

### Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbia University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering.

The organization and offerings of the school have changed several times over the years, but throughout most of its history the program has been characterized by its emphasis on principles rather than technology. The current name was adopted in 1962.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management, and Operations Research—the School of Engineering and Applied Science offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist. Programs are individually planned according to the student's preparation and needs.

The School of Engineering and Applied Science maintains extensive and varied computing facilities as well as an array of laboratory facilities to support study and research in such areas as general-purpose electronics, computer science, graphics, computer-aided design, robotics and computer-aided manufacturing, computer-aided engineering, artificial intelligence software engineering, decision support systems, human factors, communications research, power mechanics and hydraulics, environmental engineering, propulsion, soil mechanics, thermal sciences and instrumentation, thin-film development, and communications, microwaves, and lasers.

Among the special opportunities offered by the School are ten research institutes established for the purpose of creating opportunities for students and faculty research, strengthening ties with counterparts in government and industry, and contributing to the development and harnessing of emerging technology: Institute for Artificial Intelligence; Institute for Information Science and Technology; Institute for Management Science and Engineering; Institute for Reliability and Risk Analysis; Institute for the Study of Fatigue, Fracture, and Structural Reliability; Institute for Technology and Strategic Research; International Water Resources Institute; Joint Institute for Advancement of Flight Sciences (located at the NASA-Langley Research Center in Hampton, Virginia); Institute for Medical Imaging and Image Analysis; Center for High Technology. The School also offers a comprehensive program of noncredit courses through its Continuing Engineering Education Program.

### Degree Programs

The graduate course work offered in support of the degree programs in the following list is found under the departments designated by bold type.

**Civil, Mechanical, and Environmental Engineering**

#### Degrees Offered

M.S., Engr., App.Sc., D.Sc.  
M.S., Engr., App.Sc., D.Sc.  
M.S., Engr., App.Sc., D.Sc.  
M.S., Engr., App.Sc.

Computer-Aided Design	M.S., Engr., App.Sc.
Computer-Integrated Design and Manufacturing	M.S., Engr., App.Sc., D.Sc.
Energy	M.S., Engr., App.Sc., D.Sc.
Environmental Engineering	M.S., Engr., App.Sc., D.Sc.
Fluid Mechanics and Thermal Sciences	M.S., Engr., App.Sc., D.Sc.
Geotechnical Engineering	M.S., Engr., App.Sc.
Mechanical Engineering	M.S., Engr., App.Sc.
Ocean and Marine Engineering	M.S.
Solid Mechanics and Materials Science	M.S., Engr., App.Sc., D.Sc.
Structural Engineering	M.S., Engr., App.Sc., D.Sc.
Structures and Dynamics	M.S., Engr., App.Sc., D.Sc.
Water Resources Engineering	M.S., Engr., App.Sc., D.Sc.
<b>Electrical Engineering and Computer Science</b>	
Automation and Robotics	M.S.
Communications	M.S., Engr., App.Sc., D.Sc.
Computer Science (Artificial Intelligence)	M.S., Engr., App.Sc., D.Sc.
Computer Science (Hardware and Systems)	M.S., Engr., App.Sc., D.Sc.
Computer Science (Software and Systems)	M.S., Engr., App.Sc., D.Sc.
Electrophysics	M.S., Engr., App.Sc., D.Sc.
Energy Conversion, Power, and Transmission	M.S., Engr., App.Sc., D.Sc.
Medical Engineering	M.S., Engr., App.Sc., D.Sc.
Systems Science, Networks, and Controls	M.S., Engr., App.Sc., D.Sc.
Telecommunications and Computers	M.S.
<b>Engineering Management</b>	
Artificial Intelligence and Human Factors	M.S., Engr., App.Sc., D.Sc.
Construction and Facilities Management	M.E.M., Engr., App.Sc., D.Sc.
Engineering Management	M.E.M., Engr., App.Sc., D.Sc.
Environmental and Energy Management	M.E.M., Engr., App.Sc., D.Sc.
Information Management	M.S., Engr., App.Sc., D.Sc.
Management of Research and Development	M.E.M., Engr., App.Sc., D.Sc.
Manufacturing Management	M.S.
Marketing of Technology	M.E.M., Engr., App.Sc., D.Sc.
Public Works Management	M.E.M., Engr., App.Sc., D.Sc.
Systems Analysis and Management	M.S., Engr., App.Sc., D.Sc.
Transportation Management	M.E.M., Engr., App.Sc., D.Sc.
<b>Operations Research</b>	
Defense Science	M.S.
Energy Systems	M.S.
General Operations Research	M.S., App.Sc., D.Sc.
Logistics Engineering	M.S.
Management Science	M.S.
Manufacturing Systems	M.S.
Mathematical Modeling in Information Systems	M.S.
Mathematical Optimization	M.S.
Model Building for Transportation Flows	M.S.
Operations Research in Industrial	
Engineering Systems	M.S.
Quantitative Decision Making for Public Policy	M.S.
Stochastic Modeling	M.S.

### Admission

Admission application forms are available from the School of Engineering and Applied Science. They must be submitted with the specified nonrefundable application fee to the Manager of Engineering Admissions, Tompkins Hall, Engineering, George Washington University, Washington, D.C. 20052, no later than August 1 for the fall semester, December 1 for the spring semester. May 1 for the summer semester.



the first summer session, and June 1 for the second summer session. For international students the following application deadlines apply: no later than June 15 for the fall semester, October 15 for the spring semester, and March 15 for any of the summer sessions.

The applicant must request that each educational institution attended since high school graduation send an official transcript of the student's record directly to the manager of engineering admissions. Although scores on the Graduate Record Examination (GRE) are not required, the applicant who has completed the GRE should request that the scores be sent to the School.

An applicant to the Doctor of Science program must, in addition, arrange for letters of recommendation to be submitted from two faculty members of the institution from which he or she received the master's degree. One of these, if possible, should be from the master's advisor. The letters should be addressed to the appropriate department chair. After submitting the admission application form, the doctoral applicant may schedule personal interviews to discuss his or her qualifications and possibilities for an effective doctoral program.

Normally, graduate students who have been suspended from SEAS must wait at least one year before applying for readmission.

For specific entrance requirements, please see individual degree programs.

#### *English Language Requirements for International Students*

All applicants from countries where the official language is not English must take the Test of English as a Foreign Language (TOEFL). The results of the test must be sent by the administering institution directly to the Manager of Engineering Admissions, Tompkins Hall of Engineering, George Washington University, Washington, D.C. 20052. The University looks for a minimum TOEFL score of 550 in considering candidates for admission.

Students whose native language is not English and who are newly enrolled in any degree program offered by the Department of Engineering Management must also take, prior to registration, the GW English as a Foreign Language placement test administered by the English for International Students program. The results of the test will determine whether the student must complete English as a Foreign Language (EFL) course work before enrolling in other courses.

Students admitted to degree programs in departments other than Engineering Management will be required to take the GW English as a Foreign Language placement test if they did not score at least 600 on the TOEFL and 5 out of 6 on the Test of Written English (TWE). The results of this test will determine what level of EFL course work, if any, the student will be required to complete before beginning a full program of study in a SEAS curriculum. Such course work will extend the period of time needed to complete the degree.

Students who score below 425 on the TOEFL will not be admitted to the University in full degree status. However, those who meet all the technical requirements for admission and have outstanding academic records may be admitted on a provisional basis. Such students will have degree status only when they have successfully completed the level of EFL 30 within one calendar year of the date of registration.

#### *Transfer of Credit*

Up to 6 credit hours may be accepted in transfer, when applicable, to meet degree requirements of the School, if approved by the student's advisor and department chair. The credit must have been completed with grades of A or B at another accredited and recognized institution, at a level of study equivalent to that being pursued at GW. In addition, the professional and doctoral degree programs require that the credit be earned no more than five years prior to admission to the GW program, and some departments require that it be earned more recently.

Credit applied toward a previous degree may not be transferred. Transfer of credit regulations apply to courses taken as a nondegree student through GW's Division of Continuing Education.

### Regulations

See Fees and Financial Regulations; University Regulations.

### Attendance

Students may not attend classes until registration is completed. They may attend only those classes for which they are registered. Students are expected to attend all meetings of the courses in which they are registered, fully prepared to carry on the work required. Students may be dropped from any course for undue absence.

### Grades

The following grading system is used: A, Excellent; B Good; C, Minimum Pass; F Fail; CR, Credit (for satisfactory thesis completion); I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal.

At the option of the instructor, the grade of I may be recorded if a student, for reasons beyond his or her control, is unable to complete the work of the course and if the instructor is informed of and approves such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. If acceptable reasons are later presented, the instructor may initiate an appropriate grade change. Although the grade of I may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of I cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. An incomplete that is not removed within one calendar year is automatically changed to an F.

The symbol Z is assigned when a student is registered for a course that he or she has not attended and for which he or she has done no substantial graded work. The grade of Z will not be considered in determining the grade-point average.

**Credit No Credit Grading System**—SEAS students may take SEAS courses under the credit no credit grading system, but credit for such courses cannot be applied toward any degree program in SEAS.

### Residence and Continuous Enrollment

All work for the degree must be done in residence unless an exception is granted by the department chair. In addition, a student in a degree program is expected to be continuously enrolled in the School until the degree is conferred. A student who breaks his or her registration must apply for readmission to the degree program under whatever conditions and regulations are in force at that time. To maintain continuous enrollment, a student may register in one of the following categories.

**Inactive Status or Leave of Absence**—This status is available to students who are awaiting graduation (with all requirements completed); attending classes at another institution (with special approval); temporarily transferred out of the area (e.g., for military TDY); having temporary medical problems, or undertaking cooperative education work assignments.

**Continuous Research**—Students not otherwise enrolled must register for credit hour under this designation to prepare for or take the comprehensive qualifying examination.



## Master's Degree Programs

### Entrance Requirements

Admission to study toward a master's degree requires an appropriate bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, such as may be indicated by undergraduate grades, GRE scores, and similar data. (Although GRE scores are not required for admission to SEAS, applicants are encouraged to take the examination.)

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to degree candidate status. If such deficiencies are minimal, the applicant may be admitted directly to degree candidate status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he or she is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the master's degree.

### General Program Requirements

The student's program may cover a variety of fields or may concentrate in particular areas. The minimum program consists of 24 credit hours of approved graduate courses and a master's thesis (equivalent to 6 credit hours). With the approval of the department, the student may elect an optional program without a thesis that consists of a minimum of 33 credit hours of approved graduate courses. Students whose undergraduate study does not include necessary prerequisites may be required to take additional course work. All master's candidates must also pass a Master's Comprehensive Examination.

Upon admission, the student is assigned an advisor. Programs of study are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of study in preparation for the Master's Comprehensive Examination must be approved by the student's advisor and the department chair.

### Master's Thesis

The master's thesis, when required, must demonstrate the student's ability to make independent use of the knowledge and discipline of thought acquired through graduate study, to undertake constructive work in a given field, and to communicate the results of the work in writing. Suitable work for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

To register for the thesis course (299), the candidate must submit the thesis form to the appropriate department chair, on the form obtained from the department office and approved by the faculty advisor. At the beginning of the semester of expected graduation, the candidate must submit the thesis title to the dean, on the form available in the department office. While registered in the thesis course (sequence 299-300), the student is entitled to the advice of the faculty member under whom the thesis is to be written. Students may consult with their advisors. They have primary responsibility for the thesis.

The thesis in final form must be submitted to the department chair by the date specified in the calendar for the semester in which the candidate enrolls in thesis course 300. In the event a thesis is unfinished on the date specified, the student must register for continuous research. The overall time limit for earning the degree (see Time Limits, below) may not be exceeded. A thesis may be submitted only once. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination committee. If the thesis is unacceptable, the student's graduate status is terminated.

Copies of detailed regulations regarding the form and reproduction of the thesis are available in the department office. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the Gelman Library, where the duplicate copies are bound and made available for circulation.

### **Master's Comprehensive Examination**

The student must pass a Master's Comprehensive Examination to demonstrate substantial understanding of principles and methods and their use in the area of interest. This examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on the first attempt may be examined once more if approval is given by the examining committee. If the student again fails to complete the examination satisfactorily, graduate status is terminated.

### **Scholarship Requirements**

A minimum grade-point average of 3.0 is required for award of a master's degree. A student who receives two grades of F or three grades below B is barred from further enrollment in graduate courses and, ordinarily, will not be readmitted as a degree candidate. A student may not repeat for credit a course in which he or she has received a grade of C or above, unless required to do so by the department chair. A written statement requiring the student to repeat such a course for credit must be submitted to the registrar by the department chair.

### **Time Limits**

A full-time student in the master's program is allowed a maximum of three calendar years (excluding the time spent taking only English as a Foreign Language courses) to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in the master's program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence. Students who do not complete degree requirements within the allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair and approved by the dean.

## **Civil, Mechanical, and Environmental Engineering**

### **Entrance Requirements**

The applicant's background should normally include an undergraduate degree in engineering, the physical sciences, or applied mathematics. A grade average of B for the last two years of undergraduate study will normally be required.

Because computers have become an integral part of both education and research, the ability to use computers will be assumed in graduate courses.

### **Programs of Study**

Each program is designed to fit the student's needs, interests, and background. As part of the interdisciplinary program, students elect approved courses from other departments of the School of Engineering and Applied Science and from other schools of the University.

Some of the programs leading to the Master of Science are offered at the NASA-Langley Research Center, Hampton, Virginia. NASA-Langley's extensive scientific and engineering facilities are used whenever possible.



Programs are offered in the following fields. (An asterisk indicates that a program is offered at NASA-Langley Research Center but may also be offered on campus.)

**Aeroacoustics\***—Required: ApSc 211, 213; EngS 270, 274 or 276; ME 221. Other applicable courses: ApSc 212, 215, 216; EngS 217, 257, 271, 272, 273, 275, 277, 278, 279, 280, 298, 299–300, 310, 311, 312, 313; ME 312.

**Aeronautics\***—Required: ApSc 211, 213; ME 221, 275. Other applicable courses: ApSc 212, 214, 215, 216; EE 202; EngS 217, 257, 284; ME 201, 202, 203, 208, 222, 227, 231, 233, 234, 235, 237, 247, 248, 270, 271, 272, 273, 274, 276, 277, 279, 281, 290, 295, 298, 299–300, 312, 315.

**Astronautics\***—Required: ApSc 211, 213; ME 221, 276. Other applicable courses: ApSc 212, 214, 215, 216; EE 271, 272, 273, 274, 277, 278; EngS 217, 284, 285, 286, 287, 314; ME 235, 237, 238, 249, 250, 273, 280, 287, 288, 290, 298, 299–300, 315.

**Civil Engineering**—A minimum of seven courses must be taken in the department. The following courses are applicable to a general program in civil engineering: ApSc 211, 213, 214; CE 201, 202, 203, 204, 205, 206, 208, 210, 211, 212, 213, 214, 215, 216, 219, 220, 221, 223, 240, 241, 243, 250, 251, 253, 255, 256, 257, 258, 276, 298, 299–300; EMgt 204, 210, 242, 243, 261, 265, 266; EngS 228, 284, 285; ME 218, 221, 231, 255–56; OR 201, 231; Pad 242, 249, 252.

**Ocean and Coastal Engineering Option**—Required: ApSc 211 or 213 or EngS 284; CE 212, 213, 240, 255.

**Public Works Engineering Option**—Required: CE 202, 206, 213, 240; EngS 285.

**Transportation Engineering Option**—Required: CE 202, 206, 213, 240; EngS 285.

**Computer-Aided Design**—Required: ApSc 213; CSci 131, 201; EngS 282 or ME 283. EngS 284; CSci 219 or EngS 283. In place of CSci 201, CSci 157 or 120 and 158 may be taken. Other applicable courses: CE 201, 202, 203, 210, 250, 251, 254, 261, 263, 266, 267; CSci 133, 144, 212, 215, 216, 222, 224, 227, 258, 281; EngS 257, 285, 288; ME 218, 237, 238, 240, 241, 242, 246.

**Computer-Integrated Design and Manufacturing**—Required: EE 276; EMgt 253; EngS 201; ME 243, 246, 251; OR 282. Other applicable courses: ApSc 211, 212, 213; CSci 131, 201, 215, 219, 224, 226, 319; EMgt 217, 262, 270; EngS 201, 213, 221, 241, 257, 282, 283, 284, 285, 288, 314; ME 240, 241, 242, 252, 286, 299–300; OR 275, 279.

**Energy**—Required: ApSc 213; ME 221, 257, 258, 280, 286; EngS 284. Other applicable courses: ApSc 211, 212, 215; CE 243; EMgt 221, 222, EngS 206, 207, 208, 210, 212, 213, 242, 270, 274; ME 204, 224, 225, 226, 227, 235, 237, 259, 260, 261, 262, 264, 267, 281, 283, 284, 287, 290, 291–92, 293, 298, 299–300, 312, 313; OR 201. M.S. candidates without research experience are encouraged to pursue the thesis option. Students preparing for the comprehensive examination should be familiar with the material covered in EngS 218 and ME 237.

**Environmental Engineering**—Required: CE 212, 213, 219, 240; ApSc 213 or CE 212, 213, 219, 240; EngS 217, 257, 271, 272, 273, 276, 277, 278, 283, 298, 299–300; EngS 242, 284, 285, ME 261, 262, 263, 264, 267, 281, 283, 284, 287, 290, 291–92, 293, 298, 299–300, 312, 313.

**Fluid Mechanics and Thermal Sciences**—Required: ApSc 211, 213; ME 221, 275. Other applicable courses: ApSc 212, 214, 215, 216; CE 274; EE 133, 236; EngS 218, 284, 289, 315; ME 218, 222, 226, 227, 231, 233, 235, 237, 238, 261, 277, 281, 287, 289, 293, 295, 297, 298, 299–300, 310, 311, 312, 313, 315, 317.

**Geotechnical Engineering**—Required: CE 202, 206, 213, 240; EngS 285. Other applicable courses: ApSc 211, 213; CE 201, 203, 204, 205, 207, 208, 209, 210, 214, 219, 221, 255, 257, 258, 265, 282, 298, 299–300; EngS 221, 284; Geol 128, 189, 224.

**Mechanical Engineering**—Applicable courses: ApSc 211, 212, 213; CE 253; CSci 120, 133; EE 204; EngS 215, 257, 259, 282, 283, 284, 285; ME 204, 218, 221, 224, 225, 226, 227, 231, 235, 237, 238, 240, 241, 242, 243, 245, 246, 249, 251, 252, 253, 257–58, 259, 260, 261, 262, 267, 277, 280, 281, 283, 284, 286, 287, 288, 289, 291–92, 293, 295, 298, 299–300, 312.

**Mechanical Engineering Design Option**—Required: ApSc 213 or EngS 284; ME 241, 243, 246.

**Propulsion Engineering Option**—Required: ApSc 213; ME 221, 237, 241, 293.

**Robotics Option**—Required: ApSc 212; EngS 284; ME 241, 246.

**Ocean and Marine Engineering**—Required: ApSc 211, 213; CE 210; ME 221, 280. Other applicable courses: ApSc 212, 214, 215, 216; CE 212, 253, 255, 256, 257, 271, 275, 298, 299–300; EngS 228, 257, 260, 273, 284, 285; ME 204, 218, 221, 231, 277, 297, 312. (This program is also offered at DTRC, Carderock, Md.)

**Solid Mechanics and Materials Science**—Required: ApSc 211, 213; EngS 216, 231 or 241, ME 280. Other applicable courses: ApSc 212, 214, 215, 216; CE 207, 209, 253, 254, 261, 263; EngS 215, 217, 221, 222, 229, 230, 233, 234, 236, 237, 240, 249, 256, 257, 259, 284, 285, 288, 289, 298, 299–300, 315; ME 221, 281, 295, 310; BiSc 272; Chem 207, 211–12, 213; Geol 113; Phys 167, 168, 170, 211, 221–22, 224, 243, 244.

**Structural Engineering**—Required: CE 201 or 202, 206, 210; EngS 215, 285. Other applicable courses: ApSc 211, 212, 213, 214; CE 203, 204, 205, 207, 208, 215, 221, 250, 251, 253, 254, 256, 257, 258, 261, 263, 266, 267, 298, 299–300; EngS 218, 221, 233, 234, 240, 241, 256, 257, 259, 282, 283, 284, 288.

**Structures and Dynamics\***—Required for on-campus program: ApSc 213, CE 253 or 258, 261 or 263 or EngS 285; EngS 215, 257. Required for program at NASA-Langley Research Center: ApSc 213; CE 261 or 263; EngS 221 or 234, 284, 285, 286 or 287. Other applicable courses: ApSc 211, 212, 214, 215, 216; CE 207, 210, 254, 266, 267; EngS 217, 218, 221, 222, 233, 234, 240, 256, 257, 259, 282, 283, 284, 288, 289, 299–300, 314, 315; ME 233, 247; OR 251, 252.

**Water Resources Engineering**—Required: Thesis option—ApSc 213 or CE 284; CE 212, 213, 282. Nonthesis option—ApSc 213 or CE 284; CE 212, 213, 219, 240. Other applicable courses: ApSc 211, 214, 215; CE 208, 214, 216, 219, 240, 241, 255, 256, 273, 274, 276, 278, 281, 298, 299–300, 310, 311, 312; EngS 260, 284, 285; ME 221, 227, 231, 277, 312; OR 251, 252, 273.

## Electrical Engineering and Computer Science

### Entrance Requirements

The applicant must have a grade-point average of at least 3.0 (on a scale of 4.0) or equivalent, for the last 60 credit hours of undergraduate work and must be adequately prepared in the basic sciences (physics and either chemistry or biology) and in mathematics (four semesters beyond precalculus). Students are encouraged to submit GRE scores; those who do will be given preference in consideration for research and teaching fellowships.

The applicant must also have satisfied, through undergraduate studies, the specific prerequisites of the chosen area of concentration.



### Programs of Study

Each student formulates an individualized program in consultation with an assigned faculty advisor. There are no required courses or programs of study, except for automation and robotics and the computer science concentrations, which require four core courses and have specified distribution requirements (two courses in the major field and two outside it for the thesis option, four courses in and three outside the field in the nonthesis option). For all other fields offered by the department, the thesis option requires that a minimum of 12 credit hours be in the major field of concentration. For the nonthesis option, a minimum of 21 credit hours must be in the major field. A student must also select a minimum of three graduate courses outside the major area of concentration unless the student already has a graduate degree in another field. In the case of an interdisciplinary program, no courses outside the major are required, but courses must be divided approximately equally between or among the disciplines chosen.

A maximum of three courses at the 100 level may be counted toward the requirements for the degree. The following undergraduate courses may be taken for graduate credit if they are included in the student's approved program of study: EE 126, 127, 128, 133, 144, 169, 178, 184; CSci 120, 131, 133, 140, 144, 155, 157, 174, 182, 185.

Graduate students are required to attend several department colloquia each semester. These are intended to broaden the student's professional outlook and to encourage interaction with the faculty. Schedules are posted.

Programs are offered in the following fields. Courses indicated in parentheses after prerequisites are the GW offerings in the subject; approved equivalents are acceptable.

**Automation and Robotics**—Prerequisite: Computer programming (CSci 100); discrete structures for computing (CSci 133); linear networks (EE 12); analytic mechanics (ApSc 58); probability theory (ApSc 115).

Required: EE 276, EMgt 253, EngS 201, OR 282. Other applicable courses: CSci 174, 185, 201, 220, 221, 222, 224, 226, 320, 324; EE 202, 204, 208, 213, 227, 248, 252, 262, 271, 272, 273, 275, 279, 346.

**Communications**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); one course in electronics (EE 20); one course in communication theory (EE 143).

Applicable courses: EE 204, 205, 208, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 254, 257, 258, 259, 277, 298, 299–300, 345, 346, 347, 348, 349.

**Computer Science**—Prerequisite: Three courses in computer programming using assembly language, Pascal, and programming theory (CSci 51, 120, 144); two courses in computer hardware (CSci 153, 172); two courses in discrete mathematics and data structures (CSci 131, 133).

Required of all graduate degree candidates in computer science fields: CSci 212, 217, 232, 258. With the approval of the advisor and the department chair, these courses may be waived on the basis of previous study.

**Computer Science (Artificial Intelligence)**—Applicable courses: CSci 212, 215, 221, 224, 226, 228, 298, 299–300, 320, 321, 322, 324; EE 204.

**Computer Science (Hardware and Systems)**—Applicable courses: CSci 203, 212, 235, 239, 240, 243, 244, 245, 298, 299–300, 335, 337, 345; EE 126, 127, 128, 230.

**Computer Science (Software and Systems)**—Applicable courses: CSci 215, 216, 219, 222, 227, 229, 247, 255, 256, 267, 268, 270, 275, 281, 282, 298, 299–300, 327, 329, 358.

**Electrophysics (Electronics, Fields, and Waves)**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); two courses in electronics including analysis, design, and physical theory (EE 20, 121); two courses in fields and waves (EE 31, 32).

Applicable courses: EE 201, 206, 207, 221, 222, 223, 224, 225, 226, 227, 228, 232, 233, 234, 235, 236, 237, 238, 239, 255, 298, 299–300, 321, 322, 323, 329, 335.

**Energy Conversion, Power, and Transmission**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); two courses in fields and waves (EE 31, 32); one course in electrical energy conversion (EE 177).

Applicable courses: EE 178, 202, 206, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 298, 364, 368.

**Medical Engineering**—Prerequisite: Either one course in network theory (EE 11) and two courses in electronic circuits (EE 20, 121) or one course in computer programming (CSci 100) and two courses in computer hardware and software (CSci 120, 140).

Applicable courses: EE 280, 281, 282, 283, 285, 287, 289, 298, 299–300, 381, 382, 384, 385, 386.

**Systems Science, Networks, and Controls**—Prerequisite: Three courses in networks with applications using Laplace transforms (EE 11, 12, 113); one course in electronics (EE 20); one course in control theory (EE 172).

Applicable courses: CSci 220; EE 202, 203, 204, 212, 213, 214, 215, 216, 217, 218, 219, 252, 262, 271, 272, 273, 274, 275, 279, 298, 299–300, 372.

**Telecommunications and Computers**—Prerequisite: One course in communication theory (EE 143); two courses in computer science (CSci 100 and either 120 or 172). Courses chosen for the program should be divided approximately equally between the selected disciplines.

Applicable courses: CSci 131, 133, 216, 217, 227, 229, 247, 267, 268; EMgt 262, 281; EE 144, 204, 205, 242, 243, 244, 246, 248, 249, 250, 251, 257, 258, 259, 346, 347, 348.

## Engineering Management

### Master of Engineering Management

#### Entrance Requirements

An applicant for the Master of Engineering Management program must have an undergraduate degree in engineering, natural science, or mathematics. In addition, basic knowledge of calculus, the principles of management, engineering, economic analysis, and quantitative methods is required. These requirements, except for calculus, can be met by satisfactory completion of EMgt 150, 160, and 170, or approved equivalents.

A student must be accepted in a graduate program to receive credit for any graduate courses taken to satisfy degree requirements.

#### Programs of Study

Each student designs a program of study in consultation with the advisor. The core courses, EMgt 211–12 and 269, are required for the degree and must be taken prior to any other courses in the program. Programs are offered in the following fields.

**General Program in Engineering Management**—Required: EMgt core courses EMgt 297 (nonthesis option) or 299–300. Electives: 15–21 credit hours chosen from the Department of Engineering Management and other departments at the University, with no more than two courses selected from other departments.



**Construction and Facilities Management**—Required: EMgt core courses; EMgt 241, 242, 261, and 297 (nonthesis option) or 299–300. Electives: 6–12 credit hours.

**Environmental and Energy Management**—Required: EMgt core courses; EMgt 221, 222, 261, and 297 (nonthesis option) or 299–300. Electives: 6–12 credit hours.

**Management of Research and Development**—Required: EMgt core courses; EMgt 207, 255, and 297 (nonthesis option) or 299–300. Electives: 9–15 credit hours.

**Marketing of Technology**—Required: EMgt core courses; EMgt 293, 294, 297 (nonthesis option) or 299–300 and 311. Electives: 6–12 credit hours.

**Public Works Management**—Required: EMgt core courses; EMgt 215; PAd 231, 242, EMgt 297 or PAd 290. Electives: 6 credit hours chosen from engineering management and 6 credit hours chosen from public administration and/or civil engineering.

**Transportation Management**—Required: EMgt core courses; EMgt 261, 265, 266, 297 (nonthesis option) or 299–300. Electives: 6–12 credit hours.

## Master of Science

### Entrance Requirements

Applicants must have a basic knowledge of calculus, probability and statistics, principles of management, and engineering economic analysis. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Math 51, 52; EMgt 150, 160, 170. A student must earn a grade of C or better in each undergraduate prerequisite course, and in some cases a grade of B or better may be stipulated.

### Programs of Study

The following courses are required for the degree and should be taken prior to any other courses in the program: EMgt 211–12, 269. (In the systems analysis and management concentration, OR 201 is substituted for EMgt 269.) In addition to the core courses, each student must select an area of concentration from those listed below. The student is assigned an advisor with whom a program of study is developed.

**Artificial Intelligence and Human Factors**—Required: EMgt core courses; EMgt 27, 270, 287, 290, 297 (nonthesis option) or 299–300. Electives: 3–9 credit hours.

**Information Management**—Two areas of specialization are offered: software systems and applications of information systems. Only a nonthesis option is available. Required: For both specializations—EMgt core courses, EMgt 251, 297. For software systems option—CSci 131, 144, 227, 229. For applications of information systems option—EMgt 254, 256, 295, 321. Electives: Additional courses selected, with permission of the faculty advisor, to total 33 credit hours.

**Manufacturing Management**—Only a nonthesis option is offered. Required: EMgt core courses; EE 276; EMgt 204, 253; EngS 201; OR 282. Electives: 9 credit hours.

**Systems Analysis and Management**—Only a nonthesis option is offered. Required: EMgt core courses, excluding EMgt 269; EMgt 281, 282, 287; OR 201, 202, EMgt 297 or OR 291. Electives: Two courses chosen with advisor's approval, plus one from offerings of the Department of Operations Research.

## Operations Research

### Entrance Requirements

Applicants must have adequate knowledge of calculus, probability and statistics, and computer programming. This requirement can be met by satisfactory completion of ApSc 115 and 116, CSci 100, and Math 33, or approved equivalents. These courses can usually be taken concurrently with graduate courses; however, the undergraduate courses do not fulfill any part of the requirements for the master's degree.

### Programs of Study

The core courses in the field of operations research are OR 209, 216, and 299 (for those electing a thesis) or 291 (for the nonthesis option). Students must complete OR 209 and 216 before enrolling in other courses; in certain cases, however, permission may be granted for concurrent registration. Students electing OR 291 normally complete this course in the last semester of study. The remainder of the program is selected, with the approval of the advisor, in an area of concentration from courses in the Department of Operations Research or other departments of the University.

Programs are offered in the following fields.

**General Operations Research**—Recommended courses: OR 251, 252, 261, 277, 279. Electives: With the approval of the advisor, other courses within the department may be elected.

**Defense Science**—Recommended courses: OR 235, 236, 237, 251, 261, 273, 281. Electives: With the approval of the advisor, other courses within the department may be elected.

**Energy Systems**—Recommended courses: OR 235, 236, 251, 252, 271, 277, 281. Electives: With the approval of the advisor, courses may be elected from the Department of Civil, Mechanical, and Environmental Engineering.

**Logistics Engineering**—Recommended courses: OR 235, 236, 237, 251, 271, 275, 279, 281. Electives: With the approval of the advisor, courses may be elected from the Departments of Economics, Engineering Management, Management Science, and Electrical Engineering and Computer Science.

**Mathematical Modeling in Information Systems**—Recommended courses: OR 251, 271, 273, 275, 277. Electives: With the approval of the advisor, courses may be elected from the Departments of Electrical Engineering and Computer Science, Engineering Management, and Management Science.

**Mathematical Optimization**—Recommended courses: OR 251, 252, 253, 275. Electives: With the approval of the advisor, courses may be elected from applied science offerings and the Department of Mathematics.

**Model Building for Transportation Flows**—Recommended courses: OR 236, 251, 252, 254, 273, 277, 281. Electives: With the approval of the advisor, courses may be elected from the Departments of Civil, Mechanical, and Environmental Engineering; Engineering Management; and Urban Planning and Estate Development.

**Operations Research in Industrial Engineering Systems**—Recommended courses: OR 237, 251, 252, 254, 271, 273, 275, 277, 279, 281. Electives: With the approval of the advisor, other courses within the department may be elected.

**Quantitative Decision Making for Public Policy**—Recommended courses: OR 235, 236, 251, 254, 261, 271, 273. Electives: With the approval of the advisor, courses may be elected from the Departments of Civil, Mechanical, and Environmental Engineering.



mental Engineering; Economics; Public Administration; and Urban Planning and Real Estate Development.

**Stochastic Modeling**—Recommended courses: OR 271, 273, 277, 279, 281. Electives: With the approval of the advisor, courses may be elected from the Department of Statistics Computer and Information Systems.

### **Operations Research with a Concentration in Management Science**

#### **Entrance Requirements**

Applicants must have adequate introductory knowledge of mathematics and statistics. This requirement can be met by satisfactory completion of ApSc 115 and Math 52, or approved equivalents.

#### **Program of Study**

Core courses required in the field of management science are EMgt 281 or 283, 287, OR 201, 202, 235, 236, and 299–300 (for those electing a thesis) or 291 (for the nonthesis option). Students electing OR 291 normally complete this course in the last semester of study. The remainder of the program is generally selected, with the approval of the advisor, from courses in the Departments of Operations Research, Engineering Management, and Economics. The following courses are recommended: EMgt 251, 253, 254, 270, 282, 295, Econ 217–18, OR 251.

### **Operations Research with a Concentration in Manufacturing Systems**

#### **Entrance Requirements**

Applicants must have adequate knowledge of calculus, probability and statistics, and computer programming. This requirement can be met by satisfactory completion of ApSc 115 and 116, CSci 100, and Math 33, or approved equivalents. These courses can usually be taken concurrently with graduate courses; however, the undergraduate courses do not fulfill any part of the requirements for the master's degree.

#### **Program of Study**

Core courses required in the field of manufacturing systems are EE 276, EMgt 253, EngS 201, OR 209, 216, 282 and 299–300 (for those electing a thesis). The remainder of the program is selected, with the approval of the advisor, from the following: OR 251, 252, 254, 271, 273, 275, 277, 279, 281, 291.

### **Professional Degree Program**

The School of Engineering and Applied Science has established the professional degree program for those students who wish to pursue course work beyond the master's degree with emphasis on applied subject material rather than on basic research. Successful completion of the professional degree program leads to the degree of Engineer or of Applied Scientist.

#### **Entrance Requirements**

Admission to study toward the professional degree requires an appropriate master's degree from a recognized institution and evidence of capacity for productive work in the field selected as indicated by prior scholarship and, where appropriate, professional experience. The Department of Electrical Engineering and Computer Science requires applicants for the professional degree program to have had two years of professional experience after receiving the master's degree. To study toward the degree of Engineer, an applicant must have earned a bachelor's degree and a master's degree in an area of engineering.

To study toward the degree of Applied Scientist, an applicant must possess a bachelor's degree in engineering, mathematics, or natural science and a master's degree in engineering, natural science, mathematics, or administration. Applicants who have an equivalent quantitative background may be considered in special cases by the respective departments.

Normally, a B average in graduate work is required. However, the minimum does not assure acceptance; the departments often set higher admission standards.

Some programs have specified prerequisites. An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate and graduate courses as an unclassified student before being admitted to degree candidate status. In no case may courses thus taken fulfill any part of the requirements for the professional degree.

### Program Requirements

The student's program may cover a variety of fields or concentrate in particular areas. The minimum program consists of 30 credit hours of approved graduate courses beyond a master's degree. Students whose graduate study does not include necessary prerequisites may be required to take additional course work.

Programs are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of each professional degree candidate must be approved by the student's advisor and the department chair.

Each department may require its degree candidates to undertake and defend the results of a technical design project or a development problem or to prepare a comprehensive technical report to demonstrate the candidate's ability to make independent use of the knowledge and discipline of thought acquired through graduate study. When applicable, the student will be informed of this requirement by the faculty advisor at the time the student's program is being formulated. In no case, however, will this project be more than 6 credit hours out of the minimum 30.

For requirements of a specific professional degree program, please consult with the department concerned.

### Scholarship Requirements

If a student studying for the professional degree receives two grades of F or three grades below B, study is terminated and further enrollment prohibited. A student must have a final grade-point average of 3.0 to receive the degree. The Department of Engineering Management requires a final grade-point average of at least 3.1.

### Time Limits

A full-time student in the professional degree program is allowed a maximum of three calendar years to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in this program is allowed a maximum of five calendar years. This time limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence.

Students who do not complete degree requirements within the allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair.



### **Relationship with the Doctoral Program**

Candidates for the Doctor of Science degree or professional degree who are in good academic standing may, with the approval of the faculty advisor and department chair, transfer from one degree program to the other within their department if they meet the qualifications and requirements specified by the department.

### **Doctor of Science Degree Program**

The doctoral program is designed to prepare the student for a career of creative scholarship by providing a broad but balanced background of knowledge and guidance in the performance of research. The program is divided into two stages. The first, made up of a study of related fields of learning that support the general area of research concentration, culminates in the qualifying examination. The second, composed of original research and the presentation of findings in a written dissertation, culminates in the final examination.

### **Entrance Requirements**

Admission to study toward a doctoral degree requires an appropriate master's degree from an accredited institution, completed course work designated by the department as pertinent to the field to be studied, an acceptable professional background, and a capacity for creative scholarship. Departmental requirements for the grade-point average in course work leading to the master's degree are as follows (on a scale of 4.0): Civil, Mechanical, and Environmental Engineering and Electrical Engineering and Computer Science, 3.4; Engineering Management and Operations Research, 3.5.

For admission requirements of a specific Doctor of Science degree program, please consult with the department concerned.

### **Program Requirements**

Upon admission to the first stage of the program (that is, study of related fields culminating in the qualifying examination), the student is assigned a faculty advisor who directs his or her studies. In some departments a faculty committee may be appointed instead of a single advisor. Programs of study are normally structured to include a major field and two minor or supporting fields.

A minimum of 30 credit hours in a formal program at the graduate level beyond master's study is required. In many cases, particularly when the student undertakes a doctoral program in a field other than that in which the master's degree was obtained, the program of study exceeds 30 credit hours.

Students admitted to doctoral study are encouraged to undertake one year of full-time study on campus. In general, the advisor will require the student to register for a minimum of 6 credit hours of course work in every semester except the summer sessions.

To be admitted to the qualifying examination, the student must have an overall grade-point average of 3.2. If a doctoral student receives two grades of F or three grades below B, graduate study is terminated and further enrollment prohibited. The Department of Engineering Management requires a cumulative grade-point average of at least 3.4 to receive the doctoral degree.

Courses in which the student earns grades below B are not included in the total credit-hour requirement for the degree. Students who receive any grade below B are required to review their programs of study with their advisors.

### **Special Requirements**

The Department of Engineering Management requires reading knowledge of a foreign language to be demonstrated before the qualifying examination may be

taken. The student must obtain the advisor's approval of the language selected. For students whose native language is not English, English may be designated as the language of instruction by passing an examination administered for doctoral students by the English as a Foreign Language program.

Departments may also establish a tool requirement, such as an examination in a computer language.

### **The Qualifying Examination**

The qualifying examination is the principal means of determining whether a student will qualify as a candidate for the doctoral degree and progress to the second stage of the program. Its purpose is to ascertain that the student's background and intellectual development are adequate to support doctoral research in the central field. (Some departments may administer a prequalifying examination prior to completion of the study program.)

Qualifying examinations may be written or oral, or both, and are scheduled over a period of several days. They are conducted only during the fall and spring semesters, on dates established by the departments, and are administered by a faculty committee. Upon favorable report of the examiners to the dean through the department chair, the student is admitted to candidacy for the degree. The student then begins specialized study and research under the supervision of a designated member of the faculty or, in special instances, an outstanding engineer or scientist who is not a member of the faculty.

At the discretion of the committee that prepared the examination, a student who fails any part of the qualifying examination may be given a second opportunity to qualify for candidacy. Usually, the entire examination must be retaken.

Students who fail to qualify for candidacy in a doctoral program of the School will be considered to have failed on a school-wide basis and will not be admitted to further doctoral study within the School.

### **Dissertation and Final Examination**

The student admitted to candidacy for the degree of Doctor of Science chooses the faculty member under whom he or she wishes to conduct research. The faculty member may accept or reject the request to serve as the student's director of research. The research area is approved by the director and throughout the remainder of the doctoral program the candidate conducts dissertation research under the director. However, the student may consult other members of the faculty on an informal basis. Work on the dissertation is equivalent to a minimum of 24 credit hours.

**The Dissertation**—A dissertation is required as evidence of ability to perform original scholarly research and to present and interpret the results. The student is solely responsible for the content of the dissertation.

The dissertation should embody the results of an extended original study and include material deemed worthy of publication in recognized scientific or engineering journals. The student is expected to attempt to have the results of the research published as soon as possible after he or she receives the degree. The student must submit copies of the published material to the dean. Credit must be given for publication to the fact that the material is abstracted, summarized, or derived from a dissertation submitted to George Washington University in partial fulfillment of the requirements for the Doctor of Science degree.

The candidate must submit to the department five complete copies of the dissertation and an abstract (not to exceed 350 words) no later than the date specified in the calendar. The abstract is included in the announcement of the final examination and is reproduced by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.



Copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in department offices. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee to cover part of the expense of printing the abstract and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the Gelman Library, where bound copies are available for circulation.

**The Final Examination**— Upon acceptance of the dissertation by the research committee, the candidate is presented for the final examination. The final examination is oral and is open to the public. The candidate must demonstrate a mastery of the special field of study and of the materials and techniques used in the research. The committee of examiners may include qualified experts brought to the University especially to participate in the examination. The director of research serves as advocate for the candidate. When the examining committee is convinced of the quality and originality of the candidate's contribution to knowledge as well as his or her mastery of the scholarship and research techniques of the field, the committee recommends the candidate for the degree of Doctor of Science. The candidate should consult the department chair about scheduling the examination.

### Enrollment Requirements

Full-time doctoral students must register for a minimum of 12 hours per semester until 24 hours of work have been completed beyond the qualifying examination and one hour of dissertation research (course number 399) each semester thereafter until satisfactory completion of the final examination.

Part-time doctoral students must register for a minimum of 6 hours per semester until 24 hours of work have been completed beyond the qualifying examination and one hour of dissertation research (course number 399) each semester thereafter until satisfactory completion of the final examination.

No minimum load is required during the summer sessions.

### Time Limits

In general, one year of study is the minimum amount of time to be spent in preparation for the qualifying examination, although the student may apply for the examination whenever he or she feels properly prepared. The qualifying examination must be completed within five years of the date of admission, and the entire degree program must usually be completed within seven years. (Full-time students in the doctoral program in engineering management are allowed a maximum of five calendar years to complete all degree requirements.) A minimum of two years of full-time study and research should be expected in meeting the requirements for the degree. The time period for completion of the degree will be adjusted for an approved leave of absence.

## SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

Dean L.D. Leonard

Associate Dean J.R. Shotel

Assistant Dean J.C. Heddesheimer

### Introduction

The University began offering professional courses for teachers in 1904-5, and in 1907 it established a Division of Education. In 1909 the Division of Education became the Teachers College, which in its early years was concerned largely with **teacher preparation on the undergraduate level.**

In 1928 the Teachers College became the School of Education and greater provision was made for advanced study. Since that time the School has continued to grow; it now comprises a broad range of graduate and undergraduate programs. To reflect the current scope of its offerings, the name of the School was changed in 1978 to the School of Education and Human Development.

The School of Education and Human Development prepares teachers, human service and service industry personnel, resource and support personnel, and administrators for professional service. The School also offers opportunities for experienced professionals to extend and enrich their education. The programs are designed to meet the broad needs of persons who seek knowledge and skills necessary to provide effective learning and teaching, research, services, and leadership in a variety of settings. The School's programs address the preparation of individuals for all areas of education and human development, covering the life span from pre-school through the adult years in both the public and private sectors of society.

Programs provide opportunities for students to develop critical thinking and reasoning, as well as leadership, organizational, and planning skills. Emphasis is placed upon developing the human relationship qualities that are essential in fields that require involvement with people in all age ranges and from all walks of life.

The School of Education and Human Development is the administrative unit for four departments: Educational Leadership, Human Services, Human Kinetics and Leisure Studies, and Teacher Preparation and Special Education. In addition to programs of study leading to its degrees, the School offers credit and noncredit workshops designed specifically to meet the unique needs of metropolitan and school systems and other clientele in private industry and government.

Special curricula are tailored on an individual basis for liberal arts graduates and graduates of other professional schools who are interested in teaching or other human services areas. The School also offers a wide range of courses for teachers who wish to renew licenses and for provisional teachers who wish to **prepare for teaching certificates.**

Laboratory and clinical facilities are provided by the Reading Center and the Counseling Laboratory. Field experiences are provided in cooperation with public and private schools, social and health agencies, museums, institutions of the business community, and community and junior colleges.

### Education for Careers in Teaching

Programs of study for teaching careers are based upon the assumption that every teacher should have a broad general education, mastery of specific studies related to the content of instruction, and professional knowledge and competencies. The relative emphasis placed upon each of these aspects of the total education for teaching varies in accordance with the purposes of each program.



The student may choose any one of the following plans to achieve superior educational preparation for teaching or for other education-related fields.

1. Upon receiving the bachelor's degree in education, he or she may take a teaching position and, after acquiring some professional experience, return to the School for graduate study leading to the master's degree. During the first year of teaching, in particular, graduates are encouraged to establish a close contact with the School of Education and Human Development, whose faculty will provide supportive assistance to beginning teacher graduates of the school. This plan enables students with bachelor's degrees to begin their teaching careers and to use their work experience to enhance graduate study that will follow.

2. The student may choose to pursue graduate study leading to the master's degree immediately after receiving the bachelor's degree.

3. A student whose bachelor's degree is in one of the liberal arts disciplines may choose to complete the teacher certification preparation program or one of the master's programs offered by the School.

### Education for Careers in Human Services and Human Development

Programs of study for human service and human development careers are offered in the School of Education and Human Development. Master's degree programs offer advanced specialized studies in a selected field, and doctoral programs provide leadership, research, and advanced professional skills. At the master's degree level, programs include community counseling, education policy studies, exercise science, human resource development, museum education, rehabilitation counseling, and tourism administration. Specialist programs are offered in counseling, human resource development, and special education. Doctoral programs are offered in human resource development, educational administration and policy studies, counseling, and human development.

### Regulations

See Fees and Financial Regulations; University Regulations.

### Grades

For graduate work, grades are indicated as A, Excellent; B, Good; C, Minimum Pass; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal; CR, Credit. Grades A, B, C, and F are counted in computing the grade-point average (see University Regulations).

Whenever a grade has not been assigned, the symbols I (Incomplete) or the W (Authorized Withdrawal) will be recorded. The I indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An instructor recording a grade of I will normally stipulate a date by which work must be completed. The instructor has the responsibility for changing the grade of I to an appropriate grade upon completion of work or, if work is not completed by the stipulated date, determining whether the grade of I should be changed to F or allowed to remain in the record.

### Use of Correct English

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the dean.

Regulations governing English language tests and courses for all international students who are graduate degree candidates are listed under The Degree of Doctor of Education.

### **The Degree of Master of Arts in Teaching in the Field of Museum Education**

The School of Education and Human Development offers an intensive interdisciplinary program in museum education. The program is designed to prepare selected graduates, postgraduates, and professionals for work in art, history, science museums; zoos, aquaria, or nature centers; and historical societies and sites. Graduates qualify to serve as liaison persons between schools and museums and as professionals in museum-related private and public agencies.

Those interested in museum studies more generally should refer to Museum Studies under Courses of Instruction.

#### **Admission**

To be admitted to the program in museum education an applicant must have a bachelor's degree from an accredited institution; present three written references attesting to quality of academic record and work experience; submit scores on either the Graduate Record Examination or the Miller Analogies Test; and be interviewed by the Selection Committee or make alternative arrangements specified by the Committee. Skills in communication, a desire to study and learn from museum collections, and an ability to work with people are essential. Evidence of strong undergraduate, graduate, or professional experience in such fields as American studies, anthropology, art history, fine arts, history, or the biological, physical, or social sciences is desirable.

#### **Plan of Study**

All degree candidates take five sequential core courses in three successive semesters beginning in June and ending in April of the following year. Each student also pursues four elective courses in a chosen museum-related academic discipline and or museology. Two carefully supervised field placements provide direct museum education experience. In the fall semester, students serve two days a week as museum resource specialists in an educational site. In the spring semester, students hold four-day-a-week internships in a museum or museum-related organization.

### **The Degree of Master of Education**

**Elementary Education**—The Master of Education in the field of elementary education is designed for those with an undergraduate degree in a major other than education. The minimum 45-credit-hour program includes course work for students who wish to become eligible for certification for teaching at the elementary school level; additional course work in content areas may be needed to meet specific jurisdictional requirements for certification.

**Secondary Education**—The Master of Education in the field of secondary education is designed for those with an undergraduate degree in a major (or a substantial course work) in a field taught in secondary schools. The 36-credit-hour program provides eligibility for teacher certification and includes 24 hours of required courses in education theory and pedagogy and 12 hours that may be in either education or the subject area intended to be taught.

### **The Degree of Master of Arts in Education and Human Development**

The degree programs leading to the Master of Arts in Education and Human Development are designed to provide students with specialized knowledge and skills required for advanced professional competence in a variety of education, human development, human service, and service industry careers. Each program of study involves a combination of classroom and field-based learning experiences tailored to a professional specialty and individual student needs.



Students engage in a wide range of teaching and research approaches that reflect the School's commitment to excellence in professional education.

The diversity of master's programs in the School of Education and Human Development reflects its belief that education and human development comprise a multifaceted enterprise reaching persons of all ages in a variety of settings. These programs develop professional knowledge, skills, and attitudes that will enable graduates to foster human learning, growth, and development in individuals throughout society. Depending on the program specialty, students are prepared to pursue careers in schools, universities, community-based and human service organizations, cultural and leisure institutions, and business and government settings.

Master's programs are available in the fields listed on the following pages.

**Administration of College Student Development Services**—The focus of this program is on the development of broad-based administrative and management skills adapted for use in programs and services that foster college student development. The program provides preparation in administration, counseling, group facilitation, leadership training, and organizational development.

This 39-credit-hour program includes courses in foundations of college student development, college students and their communities, group theories and techniques, higher education in the United States, and foundations of counseling and human development. The program also includes supervised experience, a practicum, and seminars as deemed appropriate.

**Counseling**—The master's programs in counseling are designed to provide three specialty concentrations and one subspecialty concentration for entry-level positions in professional counseling. Program graduates are prepared to specialize in a specific field and to work in a variety of settings in which professional counseling is offered. All counseling concentrations require the equivalent of two full years of study and provide core learning experiences that combine professional and behavioral studies with supervised laboratory, practicum, and internship experiences. Some programs have specific prerequisites in addition to the general admissions requirements. The master's programs in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs. The master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education.

The core course of studies for all program concentrations includes course work in the foundations of counseling, human behavior and development, mental health problems, testing and appraisal, career development, individual and group counseling, cross-cultural counseling, and research and statistics.

**Community Counseling**—This is a 48-credit-hour program. Candidates who complete the program are prepared to enter the counseling profession in a variety of human service settings, including welfare and other social service agencies, penal institutions, court systems, employment centers, allied health agencies, government service agencies, community college counseling centers, employee assistance programs, and private practice.

**School Counseling**—This 48-credit-hour program provides professional preparation for individuals to become certified as counselors in public and private schools. The program is designed to provide students with the requisite knowledge and skills to provide professional counseling, assessment, consultation, and guidance services in a school setting.

**Rehabilitation Counseling**—This program prepares rehabilitation counselors to assist persons who are physically, mentally, emotionally, or socially disabled to assume or resume their place in society. The rehabilitation counselor works with the client to develop and implement a plan to assist in such areas as

independent living, job placement, supported employment, overcoming substance abuse and other physical and social barriers to living a full and satisfying life. The program requires 51 credit hours. In an accelerated program, persons with an undergraduate degree in human services/rehabilitation services can complete this program with a minimum of 33 credit hours.

**Employee Assistance Counseling**—This subspecialty can be elected as part of either the community counseling or rehabilitation counseling programs. This subspecialty is designed to prepare graduates as professional counselors in employee assistance programs in business, industry, and government settings.

**Curriculum and Instruction**—This program is designed to prepare teachers and other educational personnel for increased responsibilities in the planning, implementation, and evaluation of curriculum and instruction.

The 33-credit-hour program includes study in curriculum development, research and evaluation of instructional practice, teacher education, work with special populations, and school policy and management. A program specialization may include advanced study in elementary education, a content area in secondary education, English as a second language, reading, or special education. A practicum is required.

**Education Policy Studies**—The program in education policy studies is designed for students who wish to develop skills in the technical, political, and management aspects of education policy analysis. Emphasis is placed on developing both a broad understanding of the political and social environment in which education policy is formulated and the technical competence to undertake independent analysis of a policy initiative. Internships are offered in a variety of federal, state, and local agencies.

The 36-credit-hour program includes course work in the policy-making process, planning, evaluation, and current social policies influencing education. At least 9 hours of electives must be taken in a field of specialization. The student may elect to write a thesis in place of 3 credit hours of course work.

**Educational Technology Leadership**—This program is designed for persons who are entering or advancing in positions associated with schools, higher education, alternative educational settings, or other human service occupations in which computers and related information delivery technologies are used. The program of studies provides students with opportunities to develop the knowledge, understanding, and skills necessary to provide leadership in the rapidly changing environment of technology use in education.

The 36-hour program includes required course work in the theory and practice of educational technology, including the use of computers and other instructional technology systems, technological management systems, policy-making research methods, and leadership. Twelve hours of the program are specialization electives, which can be chosen, with the advisor's consent, from other departments in the University. Students may elect to complete a thesis for elective credit with the prior consent of the advisor.

**Elementary Secondary Administration**—This program provides the entry-level professional with preparation for certification in leadership positions, such as principal, assistant principal, and department head in elementary and secondary schools. Candidates must have a minimum of three years of successful teaching experience.

The 33-credit-hour program includes courses in fundamentals of education, administration, foundations of curriculum development, supervision of nonpublic schools, the K-12 principalship, supervision in the elementary and secondary schools, school business management, human relations in educational management, and school law. Certification requirements for some states may extend the program beyond 33 credit hours.



**Exercise Science**—This program is designed to develop competencies to assess physical fitness; prescribe therapeutic activities; conduct exercise programs; manage corporate fitness programs; evaluate program effectiveness; identify sports injuries, EKG abnormalities, and anxiety factors related to fitness; and apply principles of exercise physiology and kinesiology to physical conditioning and performance.

The 36-credit-hour program includes courses in motor development and life-span fitness, fitness evaluation and exercise prescription, sports medicine, principles and concepts of employee health fitness programs, and exercise, stress, and cardiac rehabilitation. Practicum opportunities on campus are available in the University's Runner's Clinic and the Cardiac Rehabilitation Exercise Program. A variety of off-campus practicum sites are also available. A comprehensive examination is required.

**Higher Education**—This program prepares students for administrative positions in institutions of higher education, associations, national and international government agencies, and business and industry. The program is designed so that a student may select a concentration in administration, teaching, or curriculum. The course of studies offers an intensive review of the history, scope, present status, and trends of higher education in the United States in comparison to selected systems in other parts of the world. Students gain knowledge and skills related to the governance, organization, and administration of colleges and universities.

The 39-credit-hour program includes courses on higher education in the United States, administration of higher education, and the community junior college. An internship is required.

**Human Resource Development**—This program is designed for persons entering or advancing in positions associated with learning in organizational settings in business, industry, government, and other large organizations in the public or private sector. The program is interdisciplinary, and students are encouraged to tailor their programs to individual career needs and objectives.

The three required courses in the 36-credit-hour program include foundations of and issues in human resource development and adult learning. Fieldwork in cooperating Washington-area business, industry, government, and community organizations may be a part of the learning experience.

**Individualized Master's in Education and Human Development**—This program provides the opportunity to develop an individualized curriculum that cuts across existing fields, both within the School of Education and Human Development and between the School and other schools and departments of the University and the Consortium. The program is designed to meet specific, identified career and professional objectives of applicants who have unique needs. The flexible program structure can be tailored to prepare for new and emerging fields in education and human development.

This program of 36 credit hours is available within or across the four departments of the School of Education and Human Development. The program must contain a 12-credit-hour core curriculum consisting of courses in human development, social historical philosophical foundations in education, and curriculum. The remaining 24 credit hours must correspond directly to the program objectives and bear a direct relationship to each of the areas identified above. A minimum of 6 credit hours of fieldwork, or the equivalent, must be a part of the program.

**Individualized Master's in Human Kinetics and Leisure Studies**—This program is designed to permit students to pursue an interdisciplinary course of studies to meet unique professional goals for special areas and fields in human kinetics and leisure studies. A set of program objectives is specified for each individual, based

on background and professional goals, and related to the overall objectives of the School.

This is a 36-credit-hour program, with specific course work determined in consultation by the advisor and student. Total credit hours may be more than 36 if additional courses are needed to meet the student's stated objectives. A practicum and oral comprehensive examination are required.

**International Education**—This program is designed for persons who are entering or advancing in positions associated with training, education, adult learning, and development activities in diverse settings that require international understanding. The program provides knowledge of other countries and cultures, using the education system as a means of interpreting and translating knowledge across cultures and analysis of the formal and nonformal school systems as they reflect history, culture, development, values, contemporary concerns, and future trends.

The 33-credit-hour program allows a selection from a variety of subspecialization areas. Four courses are chosen from international education, comparative education, selected topics in international education, international experiences, and futurism. The 9-credit-hour subspecialty complements the major area of study and may be taken in any division of the University. A comprehensive examination is required.

**Reading Progress Management: Classroom and Clinic**—This program is planned to prepare reading education professionals as special teachers, clinicians, consultants, and supervisors. The program develops competencies in the foundations of reading instruction, classroom and individual diagnosis and treatment, and specialized knowledge areas reflecting the student's career interests. The program enables students to meet the professional standards for reading specialists as specified by the International Reading Association. Theory and practice are carefully integrated in classroom courses and in practicums that are school-based or in the Reading Center, a multidisciplinary clinical center located in the School of Education and Human Development.

The 33-credit-hour program includes courses in foundations of reading development, diagnostic teaching of reading (K-6), clinical study of reading problems, and assessment of cognitive functioning. Depending on a student's career interests, courses are taken in reading in the content areas at the secondary and postsecondary levels, cognitive models and instruction, the organization and administration of reading programs, or severe learning disabilities in reading.

**Special Education**—The four master's programs in special education provide core and specialty studies and field experiences designed to prepare highly competent and committed professionals for a broad range of educational and leadership roles in the field of special education and related services.

**Early Childhood Special Education**—This program is designed to prepare educators with insight and knowledge in the areas of the development of exceptional children, handicapping conditions, identification and assessment procedures, and clinical teaching and alternative models of service for developmentally delayed young children. The program prepares teachers of developmentally delayed young children (a direct service role) and early childhood special education strategists (a consultative role).

The 39-credit-hour program includes courses in language development, social and atypical development, developmental and formal assessment, disciplinary theory, professional roles, family intervention skills, behavior management, and legal policy concerns. A seminar, practicum, and internship are required.

**Infant Special Education**—This program is designed to prepare professionals to serve the needs of developmentally delayed and at-risk infants and toddlers.



and their families. The course of study prepares students to perform direct service, administrative, consultative, and research roles in health care, human services, and educational settings. Internships in specialization areas include hospital-based programs, infant intervention settings, developmental assessment clinics, research facilities, day-care centers, and advocacy organizations. The 39-credit-hour program includes courses in medical and genetic issues, infant development and assessment, neurodevelopmental programming, technology, family systems intervention, case-management approaches, and interdisciplinary team functioning. A seminar, practicum, and internship are required.

**Special Education for Seriously Emotionally Disturbed Students**—This program prepares special educators to work as members of multidisciplinary teams in residential sites, extended day care centers, and schools that serve seriously emotionally disturbed students. Participants develop professional skills to assess problems, plan teaching strategies, create a therapeutic milieu, tap multi-agency resources, counsel students and their families, and build realistic learning and living expectations.

The 39-credit-hour program includes courses in developmental assessment, psychoeducational characteristics of the seriously emotionally disturbed student, specialized curriculum methods and intervention strategies, and interdisciplinary theory and planning approaches. Students are required to participate in an internship and in course work or clinical experiences in the Psychiatry and Behavioral Sciences and Psychology Departments.

**Transitional Special Education**—This program is designed to train those who help youth and adults with special needs to make the transition from school to independent living and employment. The program requires at least 39 credit hours of graduate course work and field experience, although the total number of hours will vary depending on the certification options selected by the student. The following areas of specialization are offered: secondary and vocational programming, collaborative vocational evaluation, corrections, school-based vocational evaluation, and learning disabilities.

**Supervision**—This program is designed primarily to prepare teachers and other educational personnel for increased responsibility in teaching and for supervisory positions. The program offerings lead toward certification for supervisory positions in most school jurisdictions. Basic courses relate to general supervisory principles and responsibilities and are also of interest to educators in non-school educational and human service agencies. Candidates must have a minimum of three years of successful teaching experience.

The 33-credit-hour program includes courses in the foundations of curriculum development, human relations in educational management, supervision of instruction, and supervision in the elementary and secondary school. Appropriate elective courses, selected with the approval of a faculty advisor, allow students to increase knowledge and skills in teaching content areas and in other humanistic and behavioral disciplines related to education and supervision. The program is structured to meet certification requirements in the District of Columbia, Maryland, Virginia, and some other states.

**Tourism Administration**—This is an internationally oriented program concerned with the professional and research aspects of travel and tourism. It places emphasis on preparation of career entry and mid-level management positions in public service organizations providing tourism services at the local, state provincial, regional, national, and international levels as well as in public, nonprofit, and private-sector organizations involved in integrated and cooperative marketing of tourism destinations, products, and services. Students may develop individualized study plans based upon defined career requirements and utilizing the resources of the University and the Washington metropolitan area.

Thirty-nine credit hours are required, including five core courses, six courses in one of three component concentrations, and an advanced seminar and practicum. Core courses include economic, social, cultural, and ecological aspects of tourism, tourism administration, tourism research, and tourism systems analysis. A 36-credit-hour thesis program with a comprehensive examination is available.

### **Entrance Requirements for the Master of Arts in Education and Human Development**

The School of Education and Human Development seeks applicants with strong academic potential, high motivation, and aptitude to do graduate-level work. Admission decisions are based on an evaluation of all material submitted in support of the application. The School requires official transcripts of all previous undergraduate and graduate course work and acceptable test scores on either the Graduate Record Examination or the Miller Analogies Test.

Two letters of recommendation and a personal interview with the Graduate Admissions Coordinator are required. The interview may be waived with permission of the coordinator for those living outside the Washington metropolitan area.

In addition to these basic requirements, individual programs may require personal interviews, relevant professional experience, and other supporting documentation before a final decision on admission is made. Upon receipt of an application to the individual School program, information on specific requirements will be sent to the applicant. The personal interview, professional experience, and supporting references provide important qualitative evidence concerning an applicant's academic potential and professional background.

The admission review is based upon a comparison of qualifications among those who apply, weighing both the School's general admissions criteria and program-specific criteria.

Positive decisions are made quickly for applicants who present uniformly strong application credentials in all areas. In some cases, unusually strong factors will offset comparatively weak factors and result in an offer of admission to provisional status in the School. For a student to be admitted to full candidacy from provisional status, he or she must earn grades of B or better in a minimum of 9 credit hours of course work.

### **International Students**

In addition to all previously listed criteria for admissions, international students must submit the following credentials:

1. Certified English translations of all prior academic records for course work that corresponds or is equivalent to the bachelor's degree in the United States. Any graduate-level work completed should also be included in the credential package. Translations that are not properly certified will not be accepted.
2. Scores of the Test of English as a Foreign Language (TOEFL), with a score of at least 580. Applicants with scores between 550 and 580 may still be considered for admission but will be required to take English as a Foreign Language course prior to beginning course work toward the degree.
3. A Financial Certificate, required of any applicant who plans to enter the United States to study at George Washington University and whose visa status is either student (F) or exchange visitor (J). Proof of funds in the form of a statement issued by the bank of the individual who is to support the student should accompany the Financial Certificate.



### Advanced Standing

Advanced standing is granted for approved courses taken at other accredited institutions, but a minimum of 24 credit hours must be completed at this University as a master's candidate. A maximum of 12 credit hours taken in nondegree status may be credited toward the master's degree.

Advanced standing is not granted for work completed five or more years before application for admission or readmission to master's candidacy. All work accepted for advanced standing must have been earned with a grade of B or better and must be approved for acceptance by both the advisor and the dean. Credit, Satisfactory, Audit, or other nonletter grades are not acceptable.

### Plan of Study

The plan of study leading to the degree of Master of Arts in Education and Human Development requires a minimum of 33 hours of graduate credit. Several programs have additional credit hour requirements. The plan may, at the student's option, include a thesis carrying six hours of graduate credit. Whether or not a student selects the thesis option, a minimum of 18 hours must be from courses planned primarily for graduate students (third-group courses). A minimum of 12 hours, not including the thesis, must be from courses offered by the School of Education and Human Development.

Programs are initially reviewed in conference with an admission advisor in the School of Education and Human Development and subsequently finalized with a designated advisor in the candidate's area of specialization. Programs are based on a candidate's interests and background; those related to teaching in public schools are designed around certification requirements of the state and locality in which the candidate plans to teach.

All degree requirements must be completed within six years.

### Continuous Enrollment and Residence

A candidate for the master's degree is required to complete satisfactorily 24 credit hours in residence. Students must be continuously enrolled in the School of Education and Human Development unless the dean grants a leave of absence. Failure to register each semester of the academic year may result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the School.

Students who are graduating, requesting grade changes from that of Incomplete, or taking the comprehensive examination must be registered for at least 1 credit hour during the semester in which these activities take place. Continuous enrollment or leave of absence status is not acceptable in these circumstances. Students may, however, choose to wait for a semester in which they are actively registered for courses to finish Incompletes. It is necessary to register for the summer sessions only if the student is applying to graduate during the summer.

All program requirements must be completed within six years of the date of admission, whether study is full time or part time.

### Scholarship

A grade-point average of 3.00 is required for graduation. Students who receive the grade of C in more than six credit hours are subject to suspension. Students who receive a grade of F must confer with the dean before enrollment for further work.

### The Thesis

Students may elect a thesis option. The choice of the thesis subject must be approved in writing by the student's advisor and filed in the office of the dean. A

statement of the School's standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the office of the dean.

Payment of tuition for the thesis course entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends beyond the additional time granted, the student must register for the entire six hours of thesis again and pay tuition as for a repeated course.

#### **Master's Comprehensive Examination**

Candidates in master's programs requiring 33 credit hours must take a comprehensive examination. Candidates in programs whose basic requirements exceed 36 credit hours may waive the comprehensive examination with approval of the academic advisor. Candidates who plan to take the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the office of the School of Education and Human Development no later than 30 days prior to the date of the examination. Comprehensive examinations are required of students in Administration of College Student Development Services, Elementary Secondary Administration, Supervision, and all programs in Human Kinetics and Leisure Studies and in Teacher Preparation and Special Education.

#### **Work in Other Academic Departments**

For teachers interested in developing or strengthening their academic competence, the master's program in Curriculum and Instruction encourages 12 to 15 credit hours of work in departments other than education. The program is designed to meet the need of in-service teachers for additional work in a content area to qualify for advanced certification or to improve classroom skills and may also be helpful to previously trained teachers planning to re-enter the profession. The major emphasis is upon strengthening both academic and professional competencies.

#### **Second Master's Degree**

Persons seeking a second master's degree in the School of Education and Human Development must complete all core and specialization requirements and a minimum residency requirement of 24 credit hours.

#### **The Degree of Education Specialist**

The program of advanced study leading to the degree of Education Specialist is for students with master's degrees in education who seek further professional preparation for specific objectives.

The program is under the supervision of the Advanced Graduate Faculty and is available in the fields of administration, counseling, curriculum and instruction, higher education, human resource development, and special education.

#### **Admissions Requirements**

The following are required for entrance to an Education Specialist program: Master of Arts in Education and Human Development or its equivalent, two years of pertinent experience in an education or human development field, and a graduate scholastic average of at least 3.3 and an acceptable score on either the Graduate Record Examination or Miller Analogies Test. Two letters of recommendation, one from a professional supervisor and one from the most recent graduate



faculty advisor, are required, along with a statement of professional goals. Each applicant must be interviewed and recommended by a faculty advisor in the major field.

### **Scholarship**

Scholarship requirements for the degree of Education Specialist are the same as those for the degree of Master of Arts in Education and Human Development (see above).

### **Programs of Study and Degree Requirements**

Individual programs are developed, through a plan of study worked out with a faculty advisor, to fit the candidate's skills, interests, and career goals. A minimum of 30 credit hours beyond the requirements of the degree of Master of Arts in Education and Human Development is required. At least 21 hours of this work must be taken in residence at GW. A maximum of five calendar years is allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate courses in education selected from the following areas: (1) foundations and cognate study, (2) background and general principles of the field of study, and (3) an area of specialization. A graduate-level research methods course must be included in the program if it was not completed in previous graduate work.

### **The Comprehensive Examination**

Successful completion of a six-hour written examination and/or an oral examination, at the option of the major field advisor, is required. Candidates taking the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

### **The Degree of Doctor of Education**

The School of Education and Human Development offers programs of advanced study leading to the degree of Doctor of Education. These programs, which are under the supervision of the Advanced Graduate Faculty, provide major fields of study in curriculum and instruction, special education, counseling, human development, educational administration and policy studies, human resource development, and higher education administration. Supporting fields are available in administration, higher education administration, college student development, counseling, curriculum and instruction, elementary education, human evaluation, human resource development, international education, program development, reading, secondary education, special education, supervision, teacher education, and tourism administration. With the approval of a student's program planning committee, course work may be taken in other departments of the University. All programs require study of interrelated areas of education and a doctoral dissertation in the major field of study.

All doctoral programs are designed to accommodate the needs of working professionals who must pursue their studies on a part-time basis. Required graduate courses, with few exceptions, are offered in the late afternoon and evening. In some programs, selected courses may be taken at off-campus locations.

### **Admission**

The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his or her objective and comparable to that required for the degree of Master of Arts in Education and Human Development.

at this University. Students with a master's degree in a field other than education may be considered for doctoral study provided that the degree and previous experience are judged relevant by the major field program faculty.

For an application to be forwarded to the major field program faculty for their consideration, an applicant must have a minimum graduate scholastic average of 3.3 and a 50th percentile score on the Miller Analogies Test or Graduate Record Examination. Under certain circumstances, the associate dean may recommend to the faculty a student who does not meet the stated criteria but who has shown **exceptional promise in the chosen field. Programs often set higher admission standards, and the number of spaces available for new doctoral students limits the number that can be accepted.**

The applicant is strongly encouraged to schedule an interview with the assistant dean, who will discuss the applicant's needs in relation to the School's resources, explain the required procedures and standards, and guide the applicant through the admission process. In addition, all applicants must have an interview with faculty members in the major field. Students receiving favorable recommendations from the major field faculty are admitted to precandidacy for the degree.

**International Students**—Students whose native language is not English and who have not earned a bachelor's or master's degree from a regionally accredited college or university in the United States are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission.

Admitted students whose TOEFL scores range between 550 and 600 will be required to take the University's English as a Foreign Language placement test prior to their first registration. Depending on the results of this test and subsequent class performance, the student's first-year academic program may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

For those students required to take EFL courses, the School's minimum English language proficiency requirement is considered to be satisfied either (a) successful completion of EFL 50 (English Composition Research Methods for International Students) with a minimum grade of B; or (b) an evaluation by the director of English as a Foreign Language indicating that the student has achieved comparable proficiency status.

### Precandidacy

In the precandidacy period a minimum of nine credit hours of course work in the program, including requirements specified by the Advanced Graduate Faculty, must be completed. Full-time students must complete this work within the first 18 credit hours; part-time students must complete it within three semesters after admission to precandidacy. Application for full candidacy will then be decided on the basis of the quality of scholarship in the precandidacy period, the recommendations of instructors, a detailed plan for the balance of the program, and a qualifying examination.

### Plan of Study

In general, from two to three years of full-time study beyond the master's degree in education, or the equivalent in part-time study, are required. Course work and examinations must be completed within five years, and the entire program must be completed within eight years.

Programs are individually planned. Each program is divided into two parts. The first consists of studies preparatory to taking major and supporting



comprehensive examinations and required research tool studies. The second consists of the doctoral dissertation and the final oral examination.

Upon admission to doctoral candidacy, the student is assigned to a program planning committee of three faculty members, one of whom must be from outside the major field of study. Students who have completed the comprehensive examinations and have received committee approval of a dissertation proposal must register for 6 hours of Dissertation Research in two consecutive semesters and 3 hours per semester thereafter, until the satisfactory completion of the dissertation or the completion of 24 credit hours of dissertation research. More specific information is available in the *Doctoral Student Handbook*.

### Comprehensive Examinations

No later than the end of the third semester, the student must pass a three-hour qualifying examination, the content of which includes material from both the major field of study and foundations of education. Doctoral students who received an Ed.S. from this University, having consequently taken a comprehensive examination, are required only to take the foundations portion of the qualifying examination. Supporting field examinations are three-hour written examinations, if required, they are taken before the integrative comprehensive examination. All course work, including the research tool requirement, must be successfully completed prior to taking the integrative comprehensive examination (the only exception is the Pre-Dissertation Seminar). The integrative comprehensive examination is a written 12-hour examination, six hours on each of two successive days. The candidate begins the second part of the program after the satisfactory completion of all examinations and the required research tool field. Candidates taking the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

### The Dissertation

A dissertation is required as evidence of ability to perform original scholarly research and to interpret and present its results.

At the beginning of the dissertation phase, the dean appoints a dissertation committee, consisting of a chairperson (usually a major field advisor) and two additional faculty members. The candidate is required to submit a proposal for the dissertation to this committee, which determines its acceptability. The dissertation is completed under the guidance of the chairperson, with the advice of the other members of the dissertation committee.

To graduate in a particular semester, the candidate must submit to the dean, no later than the date specified in the calendar, four complete copies of the dissertation and of an abstract and biographical sketch for inclusion in the announcement of the examination and for reproduction by University Microfilms, Inc. Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the office of the dean. The successful candidate for the doctorate is required, before receiving the degree, to pay fees that are applied toward the expense of binding library copies of the dissertation, printing the Announcement of the Final Examination, and the basic service rendered by University Microfilms, Inc., and to sign a microfilm agreement.

### The Final Examination

When the dissertation has approval of the dissertation chairman and at least one other committee member, the candidate is recommended to the dean for the final oral examination, which must be passed at least 30 days before the degree is to be

conferred. The examination is open to the public and is conducted by a committee of the faculty, appointed by the dean, supplemented by at least two leaders in the candidate's field of study from outside the University. Candidates who successfully pass the oral examination are recommended for the degree by the faculty of the School of Education and Human Development. Three final edited copies of the dissertation must be submitted to the office of the dean within one month of the final oral examination and no later than one month before the degree is to be conferred.

#### **Continuous Study and Residence**

Students must be continuously enrolled in the School of Education and Human Development, unless the dean or the Advanced Graduate Faculty grants a leave of absence. Failure to register each semester of the academic year may result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the Advanced Graduate Faculty.

#### **Teacher Certification Curricula**

The School of Education and Human Development provides individually planned programs for liberal arts graduates with appropriate degrees from accredited institutions who wish to prepare for teaching. Those seeking certification, but not wishing to work for a degree, may enroll in a certification program if they meet the admission and scholarship requirements of degree candidates. The School also provides a wide range of courses of interest to teachers who wish to renew licenses.

#### **Off-Campus Degree Programs**

The School of Education and Human Development offers off-campus programs leading to the Master of Arts in Education and Human Development in the fields of curriculum and instruction, higher education, human resource development, early childhood special education, transitional special education, and supervision; and the Education Specialist in the fields of administration and higher education. The programs are administered through the Division of Continuing Education.



## SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT

Dean B. Burdetsky

Senior Associate Dean M.M. Harmon

Associate Deans L. Graff, R.F. Dyer

### Introduction

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the professional development of individuals assuming membership and leadership roles in society. The School comprises nine departments—Accountancy; Finance; Health Services Management and Policy; International Business; Management Science; Marketing, Logistics, and Operation Management; Public Administration; Strategic Management and Public Policy; and Urban Planning and Real Estate Development. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

### Purposes

The School of Business and Public Management is dedicated to academic excellence through the study, teaching, and research of management and policy in the public and private sectors, both within the United States and internationally.

Because of the growing interdependence of government and business, the School of Business and Public Management practices a multidisciplinary approach with flexibility in educational programming in the belief that such is essential to dealing with the complexities of today's organizational society. The School offers preparation of both the generalist and the specialist for professional careers and seeks to improve the quality and character of the individual as citizen, professional, and scholar as well.

More specifically, the purposes of the School are

1. To prepare its graduates for positions in the management of complex organizations.
2. To provide a broad and fundamental education as preparation for positions carrying management and leadership responsibilities.
3. To provide specialized educational opportunities as preparation for career positions in professional disciplines or functional areas.
4. To explore in all their forms, through education and research, the content, interactions, and interdependencies of disciplines and institutions in the public and private sectors, both nationally and internationally.
5. To make available the School's resources to business, health, government, community, and other organizations in both the metropolitan area and the larger community.
6. To foster understanding and advancement of knowledge and skills in the world community through research, education, and scholarly exchange with governments, institutions, and organizations engaged in the solution of international trade and investment problems and in the management of human settlements.

### Academic Status

The School of Business and Public Management has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business, and the undergraduate and master's programs in

business administration are accredited by the Assembly. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. The Master of Urban and Regional Planning degree program is accredited by the Planning Accreditation Board. The Master of Association Management degree program is recognized by the American Society of Association Executives. The School is a member of the National Association of Schools of Public Affairs and Administration, and its Master of Public Administration degree program is accredited by the NASPAA Commission on Peer Review and Accreditation.

### Regulations

See Fees and Financial Regulations; University Regulations.

### Attendance

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

### Withdrawal

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances and requires certification by the instructors of courses for which the student is registered that the student is doing passing work (see Withdrawal under Regulations).

### Adding Courses

Courses may not be added after the first two weeks of classes in any semester.

### Independent Study Plan

A junior, senior, or graduate student of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis.

### Use of Correct English

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition is charged. The granting of a degree may be delayed for failure to make up the deficiency in English to the satisfaction of the dean.

### Students from Other Schools Within the University

Degree candidates from other schools of the University cannot register for more than 18 hours of credit in courses from the Bachelor of Accountancy or Bachelor of Business Administration degree programs or 12 hours of credit from the Master of Accountancy, Master of Taxation, or Master of Business Administration degree programs. Typically, a maximum of 6 hours of credit is permitted.



courses from the Bachelor of Accountancy program, unless an advisor recommends an additional 3 credit hours.

### **Common Body of Knowledge**

Programs leading to the degrees of Bachelor of Accountancy, Bachelor of Business Administration, Master of Accountancy, Master of Taxation, and Master of Business Administration include the equivalent of at least one year of work in the following areas:

1. A background of the concepts, processes, and institutions in the production and marketing of goods and services and the financing of the business enterprise or other forms of organization.
2. A background of the economic and legal environment as it pertains to profit and nonprofit organizations, along with ethical considerations and social and political influences as they affect such organizations.
3. A basic understanding of the concepts and applications of accounting, quantitative methods, and information systems.
4. A study of organization theory and behavior and interpersonal communications.
5. A study of administrative processes under conditions of uncertainty, including integrating analysis and policy determination at the overall management level.

### **The Master's Degrees**

#### **Entrance Requirements**

To be considered for admission, applicants must present a bachelor's degree from a regionally accredited college or university. Application is made directly through the Office of Academic Advising and Student Services, School of Business and Public Management. Admission to master's programs is highly competitive. Previous academic history, performance on the applicable entrance examination, letters of reference, motivation and aptitude to do graduate-level work, and professional experience are all taken into consideration.

Applicants for admission to programs leading to the degrees of Master of Accountancy, Master of Taxation, and Master of Business Administration must submit scores on the Graduate Management Admission Test. Applicants for admission to programs leading to the degrees of Master of Health Services Administration and Master of Urban and Regional Planning must submit scores on the Graduate Management Admission Test or the Graduate Record Examination. Applicants for admission to programs leading to the degree of Master of Public Administration and Master of Association Management must submit scores on the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08541. Correspondence concerning the Graduate Management Admission Test should be addressed to Box 966, concerning the Graduate Record Examination, to Box 955. Test scores that are more than five years old are not accepted for admissions review.

**Additional Requirements for International Students**—Students from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on TOEFL and score 5 out of 6 on the Test of Written English (TWE) will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

For those students required to take EFL courses, the School's minimum English language proficiency requirement is considered to be satisfied either (a) successful completion of EFL 50 (English Composition: Research Methods for International Students) with a minimum grade of B; or (b) an evaluation by the Director of English as a Foreign Language indicating that the student has achieved comparable proficiency status.

**Transfer Within the School**—Currently enrolled students wishing to transfer from one graduate degree program and/or field of instruction to another within the School must complete the appropriate application through the Office of Academic Advising and Student Services. Applicants for transfer are subject to requirements in effect at the time of transfer. In addition, students must resubmit all required credentials no later than the established completion dates for the semester or summer session for which the transfer is requested.

### Readmission

A student who withdraws, is suspended, or is otherwise absent without authorization from the University for one semester or more must make formal application for readmission and resubmit all supporting credentials including transcripts from previous schools attended, including George Washington University, and entrance examination scores. If readmitted, the student is subject to the rules and regulations in force at the time of return. If the student has attended one or more regionally accredited colleges or universities during absence from the University, complete official transcripts must be sent to the Office of Academic Advising and Student Services from each institution attended.

The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of last registration at the University and has not since registered at another college or university.

### General Requirements

All students must complete the prescribed minimum number of credit hours of graduate course work. A maximum of one-quarter of the credit hours of graduate course work required beyond First-Level (Common Body of Knowledge) or other required prerequisite courses may be approved for transfer to the School of Business and Public Management from the Division of Continuing Education, another degree-granting division of this University, or another regionally accredited college or university under the following conditions. The course work must be approved as part of the student's program of studies; it must not have been applied to the completion of requirements for another degree; it must be at the graduate level; it must have been taken within the two years prior to acceptance into the program; and the student must have received a grade of B or better. Action must be approved by a petition to the Director of Academic Advising and Student Services. A transcript and description of the course work must be submitted before the petition can be considered. Should advanced standing be granted, credit will count, however, only grades earned in courses in the Departments of Public Administration, Health Services Management and Policy, and Urban Planning and Real Estate Development while in nondegree status will be used in calculating the cumulative grade-point average.

Master's degrees are awarded by vote of the Faculty on completion of the required course work, completion of an acceptable thesis (if one is elected or required) or the equivalent work, and the passing of the Master's Comprehensive Examination if required in the chosen degree or field of instruction.



Second-group courses (numbered 101-199) may be counted toward the master's degree only when registration for graduate credit has been approved by petition at the time of registration by the Director of Academic Advising and Student Services and the designated faculty advisor. No work counted toward a bachelor's degree may be counted toward a master's degree. However, a student who has completed the equivalent of a Common Body of Knowledge course with a grade of C or better as part of the bachelor's degree program may request by petition a waiver of that course at the master's level. A grade of C earned in Econ 217 and 218 at GW while in degree or nondegree status is sufficient to waive that portion of the Common Body of Knowledge requirement.

Full-time students are expected to register for a minimum of 9 to a maximum of 12 credit hours each semester. A graduate student who is employed more than 20 hours a week may not take more than 6 credit hours. All work for a master's degree must be completed in five years.

Students who expect to continue studies for a doctoral degree after receiving the master's degree should ask for assistance in planning their programs of study.

No credit is granted for work done in absentia or without formal instruction, except for hospital residency, supervised field experience, independent study, and the thesis, which may be completed in absentia with the permission of the department, designated faculty advisor, or committee concerned.

### Master's Comprehensive Examination

Written Master's Comprehensive Examinations are required only in the Master of Science in Information Systems Technology and Master of Urban and Regional Planning programs. Degree candidates should consult designated faculty advisors about examinations required and material to be covered. In writing the examinations, students are expected to demonstrate what has been learned in course work and from the literature of the field. The examinations normally require four to eight hours. Sections broadly cover the various fields that the candidate has selected.

Examinations are generally scheduled in the fall and spring semesters and should be taken during the last semester of course registration or shortly after completion of prescribed course work.

A written application is filed with the department supervising the student's field of study at the time of registration for the semester in which the examination is to be taken. Before applying, the student must have completed all courses in the program or be enrolled in the last semester and must have achieved a 3.0 (B) average. After applying for the examination, a candidate may withdraw only by written notice to the department chairman.

A candidate who fails the examination should consult with the designated advisor about a subsequent course of action.

### Scholarship Requirements

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; F, Fail; I, Incomplete; IP, Progress; CR, Credit; W, Authorized Withdrawal; and Z, Unauthorized Withdrawal.

An average of B or better is required for the master's degree. The grade of C is not considered as failing but must be balanced by a grade of A in a graduate course of equal status. A minimum grade-point average of 3.0 is required for award of a graduate degree. All graduate courses and undergraduate courses taken for graduate credit after matriculation as a degree candidate (except those audited or taken for the grade of CR) will be used in the calculation of the grade-point average.

A student whose grade-point average falls below 3.0 after completing a minimum of 9 credit hours will be placed on probation. This probation extends

through the period in which the student next attempts 12 credit hours of work including prescribed courses. During this period the student's performance will be monitored to determine suitability for continued study. A student who is subject to probation for a second time is automatically suspended.

A master's degree candidate who receives a grade of F is required to present cause, for consideration by the Director of Academic Administration, as to why continued study should be permitted.

A master's degree candidate given the grade of F in a required course, and permitted to continue in graduate studies, must repeat the course and achieve at least the grade of B. (Such a repeat does not expunge the grade of F, which remains part of the student's record.) Should this level of performance not be obtained, the student will be denied further registration as a degree candidate.

### Suspension

A graduate student who does not meet the conditions of probation (see above) will be suspended. A student who is suspended or withdraws under these conditions may apply for readmission after the lapse of one semester. To be readmitted the student must submit evidence that indicates academic success. If readmitted, a student so readmitted will continue on academic probation and must achieve a minimum grade-point average of 3.50 in the next 12 semester hours of graduate study. Should the student fail to achieve this minimum grade-point average, a second suspension will result and subsequent readmission will be denied.

### Incomplete/Withdrawal

Conditions under which the grades of I (Incomplete), W (Authorized Withdrawal), or Z (Unauthorized Withdrawal) may be assigned are described under University Regulations.

The grade of I must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of I is assigned. An Incomplete that is not changed within this period automatically becomes an F. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the Director of Academic Administration for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of I cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

### Thesis

Students contemplating doctoral study are strongly urged to include the thesis as an elective in their master's program. The thesis subject should be selected as early as possible to permit effective integration with the course work.

The subject must be approved by the professor in charge of the student's thesis. The thesis in its final form must have the approval of the professor in charge and must be presented to the dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the semester in which registered for thesis seminar (299) and/or thesis research (300), to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time is granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends more than three semesters beyond the date registered for thesis



research, the student must register for the entire required hours of thesis again and pay additional tuition.

### **Master of Accountancy**

The Master of Accountancy degree is designed to prepare students for professional careers in accounting either in the public or private sector. A particular objective of the program is the student's attainment of professional certification. The Master of Accountancy is recognized as the necessary fifth year of education in a professional accounting program, and as such, it is superimposed on a Common Body of Knowledge in accounting and business subjects. The Common Body of Knowledge is ordinarily attained by the completion of a bachelor's degree in accounting or business from a regionally accredited institution of higher education.

The program consists of 60 credit hours of course work, of which 27 may be waived if comparable study has been completed prior to admission. Six semester hours of course work of the minimum program of 33 hours may be awarded as advanced standing.

Students should verify state regulations concerning the Certified Public Accountant Examination for the state in which they plan to practice.

The program of study consists of two levels.

**First Level (Common Body of Knowledge Courses)**—Accy 201, 202, 211, 297; Fin 220; MLOM 240; Econ 217; Mgt 201, 218, 270. This set of courses must be completed prior to enrollment in Second-Level courses, except Accy 297, which must be taken in the last semester of the program. All of these course requirements, except Accy 297, may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. First-Level courses may not be taken to satisfy Second-Level requirements or electives.

**Second Level**—Accy 221, 225, 251, 261, 275, 282; one course chosen from Accy 262, 263, or 264; and three graduate-level courses chosen from accountancy with advisor approval. No more than three taxation courses may be included in the program.

### **Master of Association Management**

The Master of Association Management prepares students to undertake or advance in careers in association management. It is also for practitioners who already work with nonprofit associations of various kinds—trade, public, interest, membership, and special interest associations; scientific, technical, and learned societies; trade unions; political action committees, religious and fraternal organizations; foundations; and local ad hoc groups. Substantive areas comprising the Master of Association Management program are marketing strategies and representation; comparative institutions; communications, media, and information systems; finance and accounting; analytical and research methods. The 42-credit-hour program is interdisciplinary, consisting of a ten-course core, three other required courses, and an elective course.

#### **Required Courses**

Core courses: AM 270, 271, 272, 273, 274, 275, 276, 277, 279; PAd 295, 296.

Any two of the following courses: PAd 212, 213, 215, 216, 242, 245.

Any one of the following courses: PAd 223, 224; Mgt 204, 210, 212, 213.

Elective—With the approval of the advisor, the student may satisfy this requirement by choosing any 3-credit graduate-level course either from the courses listed above or from other courses offered by the University.

## Master of Business Administration

The Master of Business Administration degree is designed to prepare students for careers in management in both the private and public sector. The program of study leading to the Master of Business Administration provides a basic foundation in the functions of business, the environment in which it operates, and the analytical tools needed for intelligent decision making. The program provides in-depth study of one field of instruction and broad exposure to subjects and issues at the general management level.

The program consists of 60 credit hours of course work, of which 27 hours of first-level courses may be waived if comparable study has been completed at a regionally accredited college or university prior to admission. Thus the shortest possible program is 33 credit hours.

The program of study consists of two levels and contains four components:

**First Level (Common Body of Knowledge Courses)**—Econ 217-18; Accy 200; Mgt 201, 218, 270; Fina 220; MLOM 240; SMPP 201, 297. This set of courses must be completed prior to enrollment in second-level courses, except SMPP 297, Strategy Formulation and Implementation, which must be taken in the last semester of the program. All of these course requirements, except SMPP 297, may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. Common Body of Knowledge courses not completed before the applicant matriculates in the School of Business and Public Management will be assigned in the letter of admission. First-level courses may not be taken to satisfy second-level requirements.

### Second Level

1. **Five Breadth Courses**—Breadth courses provide exposure to a broad range of subjects intended to develop professional competence in general management. In consultation with a faculty advisor, students select five courses from at least four fields outside the field of instruction. Students may design a program in consultation with their advisor that is tailored to individual career goals.
2. **Four Field of Instruction Courses**—This set of courses gives students depth of understanding in a selected field. Courses are selected in consultation with the faculty advisor and may be tailored to individual interests.
3. **One Elective Course**—Students may select any graduate-level course to satisfy this requirement after consultation and approval of the faculty advisor.

### Fields of Instruction

Students select a minimum of four courses from one of the following fields:

**Business Economics and Public Policy**—This field is directed toward understanding, analyzing, and dealing with the principal forces shaping the business environment. Special attention is given to the policies and programs of governments, social and cultural change, and the structure, evolution, and situations of the economy. Students in this field take courses that survey the social, legal, political, and economic environment of business and the micro- and macroeconomic foundations of government programs and of business response to these programs.

**Decision Systems**—At all organizational levels, decision making is among the most important and most difficult responsibility of managers. This field prepares students to work with systems to improve and assist the decision process. The field is applications oriented and utilizes mathematical, statistical, and computer models. The student may choose either of two tracks: quantitative analysis for decision making, which focuses on the operations research content of decision systems, or decision support systems, which emphasizes computerized systems that support the decision process.



**Finance and Investments**—This field prepares students for careers in finance and investments, providing a background in business budgeting, controllership, treasury, long-range planning, reporting, and financial management processes. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions. Instruction not only applies to manufacturing and trading enterprise but, in addition, includes railroad and public utility financing, each of which has distinctive operating features.

**Human Resources Management**—This field is concerned with all aspects of the employment of human resources in business organizations. Career opportunities are open in domestic and international business organizations, hospitals, trade associations, research and educational institutions, and local, state, and federal government agencies. Courses encompass all phases of the recruitment, selection, employment, and development of people, industrial relations, unionism, collective bargaining, labor relations, and manpower utilization.

**Information Systems Management**—This field is concerned with issues related to modern information and decision support systems in private and governmental organizations. Areas include systems analysis, user-system psychology, and trends in information systems. The program is designed for the professionals responsible for analyzing the information system needs of an organization and developing an implementation plan for meeting requirements that deals with the determination of the information needs and information flows within the organization.

**International Business**—This field is designed to prepare students for careers in international banking, international and multinational corporations, and export trading companies; for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the commerce option of the Foreign Commercial Service. The program is also designed to prepare international students for careers in foreign and domestic firms within their own countries and for commercial officer positions within their governments.

**Logistics, Operations, and Materials Management**—This field addresses issues related to management and operating skills in materials acquisition, production, quality control, distribution, maintenance, and support functions throughout the life of the organization, system, or product. The program focuses on the integration of the managerial functions associated with transactions, technology, production, and services necessary to institutional success. Each student elects a study track (procurement and contracting, physical distribution, or product operations) in consultation with the advisor.

**Management of Science, Technology, and Innovation**—This field explores the many aspects of technology relating to and influencing research and development management, business, and public policy. The concentration has been designed to identify and study the problems associated with managing creative professional people in a dynamic technology. As a contextual area, the program stresses the need for students to undertake original and meaningful research involving political, economic, sociological, and operational problems encountered by management in industrial, governmental, and military research and development organizations.

**Marketing**—This field is concerned with the development of professional marketing managers whose responsibilities may include planning and developing new products, services, and ideas; advertising, selling, and merchandising; and arranging distribution channel systems. Courses cover all aspects of the marketing management function. Specialized elective courses utilize the resources of the Washington metropolitan area.

**Organizational Behavior and Development**—This field reflects the assumption that the specialist in behavioral science is skilled in theory and research and applies technical and specialized knowledge as a force in effective organizational growth and improvement. The program helps meet the need for professionals capable of designing, creating, and developing the necessary behavioral and organizational systems appropriate to rapidly changing societies. Emphasis is on the interrelationships of motivation, leadership, problem solving, organizational growth, and increased complexity of modern organizations and their effect upon the functions of organizational development.

**Real Estate Development**—This field is designed to provide interdisciplinary and applied studies for students preparing for a career in real estate development. The field combines the fundamental economic principles and concepts that govern the real estate investment and development process with those that emphasize the analysis of specific projects, including site requirements and physical relationships, holding capacity, market conditions, financial feasibility and requirements, legal framework and constraints, and opportunities associated with the public sector and long-term community needs.

**Systems Theory and Cybernetics**—This field provides a broad, interdisciplinary perspective for dealing with complex management problems. Systems theory identifies principles of organization common to physical, biological, and social systems, while cybernetics is defined as the science of communication and control in man, machine, and society. As the size and complexity of organizations increases and as social and technological change accelerates, this field has evolved as a way to understanding the underlying principles of organization and management. The field is relevant to the operating manager or policymaker in the private or public sector.

### Master of Health Services Administration

The Master of Health Services Administration degree program is designed to provide a core of generalist administrator courses for all students, coupled with specialized elective fields of instruction to meet the interests and career objectives of individual students.

The program of study consists of 54 credit hours of course work. In addition, credit hours each in accountancy, economics, and statistics are prerequisites. Comparable study has not been completed at a regionally accredited institution prior to matriculation as a degree candidate.

The generalist core includes the following nine courses: HSMP 202, 203, 207, 210, 211, 212, 215, and Mgt 210. In addition, each student must take two advanced HSMP courses, one chosen from Group I and one from Group II from among the following.

Group I (Policy Planning)—HSMP 221, 223, 225, 227, 252, 255.

Group II (Management)—HSMP 231, 233, 235, 236, 237, 238, 239.

During the last semester on campus, each student must also complete HSMP 245, which serves to integrate the concepts and methods of health services administration.

The fields of instruction each comprise 18 credit hours, including an experience-based learning component. In some fields of instruction, a one-year (credit-hour) administrative residency is mandatory. In other fields of instruction, the student may choose a 3-credit-hour internship and 6 credit hours of additional course work as a substitute for the 9-credit residency. Consequently, fields of instruction fall into one of two patterns.

**Residency Option**—Specialist course work, 9 credits, administrative residency, 9 credits. Students will not be permitted to enter any administrative residency unless they have attained a 3.0 grade-point average with no grades



**Internship Option**—Specialist course work, 15 credits; administrative internship, 3 credits.

Courses comprising the field of instruction may be taken in the Health Services Management and Policy Department or other departments in the School of Business and Public Management, the University, or the Consortium of Universities. Each student develops a set of conceptually related courses suitable for the field of instruction and individual career objectives. The choice of courses must be approved by the faculty advisor and the department(s) offering courses.

This curriculum structure gives students an unusual opportunity to develop academic programs particularly suited to their needs. The core courses and the two advanced HSMP courses provide students with generalist administrative competence, the nine fields of instruction offer a wide choice of areas in which to develop special expertise. A 9-credit administrative residency is required in the fields of management of acute-care hospitals, management of long-term care services, and management of ambulatory health services. In all other fields, students may choose the amount of experiential learning they wish to include in their programs, which can affect the number of months required to complete the program; that is, for a full-time student the residency option will require 28 months, while the internship option will require 20 months.

#### Fields of Instruction

**Management of Acute-Care Hospitals**—This field of instruction is designed to provide an understanding of the organization, management, and interrelationships of hospital clinical, support, and administrative functions, and analysis of systems and procedures used to provide short-term inpatient services. Students are also provided with a managerial base in the areas of health services policy-making, regulation, and legislation.

**Management of Long-Term Care Services**—This field deals with medical and support services required by those who cannot function independently. These services are provided in homes for the aged, rehabilitation or psychiatric hospitals, hospitals or homes for the mentally retarded and developmentally disabled, chronic care and geriatric centers, and the client's home. The field also provides a management base in health services planning, policy-making, regulation, and legislation.

**Management of Ambulatory Health Services**—This field addresses the management of the delivery of health and medical services to individuals who do not require the constant supervision associated with inpatient care. Instruction focuses on the management of services in organizational settings in which individuals are engaged in delivering ambulatory care as a service offered by a formal organization. Ambulatory services managers also work in the areas of health services planning, policy-making, regulation, and legislation.

**Health Information Systems**—This field is designed to provide an understanding of information systems as they are used in the administration of health services. The concepts of information and computer systems are emphasized. Examples of the areas of application are medical records, program evaluation, community national health statistics, financial management assessment, and productivity control.

**Health Services Financial Management**—This field responds to a demand for a thorough understanding by the administrator of financial management in health institutions. The instruction includes managerial accounting, cost analysis, financial decision making, capital formation, and investment analysis, with specific adaptation to unique problems within the health care field.

**Health Services Materials Management**—This field explores the management of physical resources in health service institutions. The instruction focuses on the

purchase and management of supplies and equipment, inventory management, contracting, cost allocation, plant operations, and facilities maintenance.

**Health Services Policy**—This field is intended to meet the growing demand for specialists in health policy analysis and development. The curriculum provides training in basic and advanced policy analysis skills and the application of those techniques to practical health care policy-making situations. Students may pursue more general public policy courses in other departments as electives. The program includes at least one three-credit internship in a health policy position.

**Health Services Planning and Marketing**—This field is designed for those who wish to focus on strategic planning and marketing of health care systems and health care institutions. Planning and marketing skills enable the student to develop and implement strategic and business plans and to conduct marketing activities within health services organizations. The overriding concept is that of strategic health decision making based on systematic analyses with an awareness of values.

**Health Services and Operations Research**—This field deals with the application of research techniques and methodologies to the delineation of policy issues and the generation of solutions to problems in the organization, delivery, and financing of health services. Operations research is the application of mathematical techniques such as linear and nonlinear programming, queuing models, and simulation to develop solutions for operating and policy problems.

**Human Resources Management**—This field covers resources planning, allocation, utilization, and development and evaluation of health services personnel. Included are the various personnel functions, the development of personnel policies and procedures, employee and labor relations, and collective bargaining.

### Master of Public Administration

The Master of Public Administration degree program prepares students for professional careers not only in the public service (federal, state, and local), but also in organizations that require a knowledge of public policy and administration, such as public interest groups and research institutes. The 42-credit program, outlined below, is intended to provide both a generic core for all students and specialized elective fields tailored to the interests and career objectives of each individual student. The curriculum provides graduate instruction in all areas recommended by the Guidelines and Standards for Professional Master's Degree Programs issued by the National Association of Schools of Public Affairs and Administration.

All students are required to complete an eight-course (24-credit-hour) core which includes courses in public administration and management, public expenditure analysis, public policy, organization theory, human behavior in organizations, and research methods; at the end of the program, students are required to take PAd 289, which serves to integrate the diverse perspectives in public administration.

Each student selects, in addition, an elective field designed to provide a deeper and broader knowledge in a field of particular interest. The elective fields generally require a four-course sequence. With the approval of a faculty advisor, the student may design a special field when none of the fields offered meets individual learning and career objectives.

Students who lack substantial knowledge of the structure and functions of government are strongly encouraged to take one of two courses in American administrative institutions: PAd 213, Administration in the Federal Government, or PAd 242, Administration of State and Local Governments. The remainder of the program consists of two elective courses chosen by the student.



the advisor's approval. The electives may be taken in any related program or discipline.

Because public service requires a wide variety of expertise, students with all undergraduate degree backgrounds are considered for admission. There are no specific course prerequisites.

### Required Courses

**Core Courses:** PAd 205, 295, 296, 260 or 261; Mgt 210 or PAd 221, PAd 252, 289, 213 or 245.

**Elective Field**—four courses (see below)

**American Administrative Institutions:** Either PAd 213 or 242 is recommended as an introductory course. In some of the elective fields, either course may be counted as 3 of the 12 required credit hours.

**Two Elective Courses**

### Elective Fields

The nine elective fields offered within the Department of Public Administration are described below. Four courses are required for each field. In addition to the fields listed below, students may elect such other standard four-course fields as Business Economics and Public Policy, Organizational Behavior and Development, Information Systems Management, International Business, and Decision Systems. Students may also take an approved four-course sequence in the Department of Health Services Management and Policy or the Department of Urban Planning and Real Estate Development. Moreover, a special field may be constructed, tailored to the student's academic interests and career objectives. To take a special field, the student writes a brief justification, specifying the courses to be taken, and submits it by petition through the faculty advisor.

**Budget and Public Finance**—This field covers the processes and institutions involved in budgeting, including the practical requirements of financial management; addresses issues of intergovernmental finance in a federal system; and imparts knowledge of alternative methods for allocating scarce public resources.

**Executive, Legislative, and Regulatory Management**—This field offers students the opportunity to develop an expertise in the management of federal government. With focus on the practical functions of public management, the field addresses the workings of the executive and legislative branches, emphasizing the regulatory process, the civil service, administrative law, and congressional oversight.

**Management of National Resources**—This field is designed to provide advanced course work exclusively to senior military and civilian officers at the Industrial College of the Armed Forces. The field prepares these officers for assignments that will require them to work closely with the private and public sectors in national resources management in time of war, and it prepares them for professional careers in the public sector.

**Managing in Public Organizations**—This field gives primary attention to the managerial processes by which organizations are structured and their work undertaken. It includes courses in organizational theory and large organizations but is also concerned with the management of governmental activities.

**Managing State and Local Governments**—This field deals with a range of federal, state, and local problems and issues, including alternative governmental structures and assignments of functions, sources of revenues and expenditure patterns, intergovernmental relations and management concerns, local government financing, and the formulation and analysis of urban policies.

**Policy Analysis and Evaluation**—The policy field is designed for those who wish to focus on the processes of public decision making and develop abilities to analyze and evaluate those processes.

**Procurement and Contracting**—This field covers the many activities of government performed under contractual arrangements. Procurement action is often subject to unique practices and regulations and requires the acquisition of specialized knowledge and skills in the processes of procurement and contracting. This elective field is offered jointly with the Department of Marketing, Logistics, and Operations Management.

**Public Human Resources Administration and Manpower**—This field addresses the traditional concerns in public administration with personnel, the staffing function of public organizations, and labor relations in the public sector. Courses are also offered in manpower development and the use of human resources.

**Telecommunications Management**—This field is designed for public managers who need to understand the various capabilities of telecommunications to organize and utilize information within an organization, the policy issues involved in the regulation of telecommunications, and the terminology and structures of telecommunication systems.

### Internships

Students with little or no professional experience are strongly encouraged to take an internship during the degree program. There are many opportunities in the Washington area for intern experiences in federal agencies, county and city government agencies, and the quasi-public sector. The Department assists students in securing appropriate internships; students are also encouraged to find internships on their own initiative. A substantial effort is made to relate intern experience to the student's academic program. Internships may be paid or unpaid and may be taken for credit or not for credit. To receive academic credit, students must have completed 9 credit hours in the degree program. In general, internships for credit involve 15–20 hours of work per week for 14 weeks.

### Master of Science in Information Systems Technology

The Master of Science in Information Systems Technology is designed to provide students depth of understanding in a selected major field. The program offers two major fields: (1) information systems development and (2) applied artificial intelligence and expert systems.

The program consists of 51 credit hours of course work, of which 21 may be waived based on a student's prior background.

The program consists of the following requirements:

1. Twenty-one credit hours of prerequisite courses in programming language, assembly language programming, computer systems architecture, data structures, systems analysis, operating systems, data communications, and database systems.
2. Thirty credit hours of major field and other related courses.
  - (a) Information systems development—Mgt 280, 282, 283, 284, 285, 288, 289, and two 3-credit elective courses.
  - (b) Applied artificial intelligence and expert systems—Mgt 280, 281, 283, 285, 288, 291, 292, MLOM 255, and a 3-credit elective course.
3. Successful completion of a capstone project concurrent with Mgt 287 in the information systems development field or Mgt 292 in the applied artificial intelligence and expert systems field.



## Major Fields

**Information Systems Development**—This field provides thorough preparation for a career in the application of computers to the complex data and information problems found in organizations today. The program emphasizes the practical understanding of contemporary design and implementation approaches within the development of computer-based systems.

**Applied Artificial Intelligence and Expert Systems**—This field stresses the practical applications and basic underpinnings of artificial intelligence, especially expert and knowledge-based systems. The program provides a firm foundation in information systems technology, while emphasizing aspects of applied artificial intelligence and knowledge engineering.

## Master of Taxation

The Master of Taxation degree is designed to prepare students for careers as tax professionals in public accounting, private industry, and government. The program of study provides a thorough understanding of the tax laws and their application. It also supplies the necessary foundation for a broad appreciation of the business environment.

The program consists of 60 credit hours of course work, of which 27 hours of first-level courses may be waived if comparable study has been completed prior to admission. Six credit hours of the minimum program of 33 hours of course work may be awarded as advanced standing.

The program of study consists of two levels.  
**First Level (Common Body of Knowledge Courses)**—Accy 201, 202, 211, 297; Fin 220; MLOM 240; Econ 217; Mgt 201, 218, 270. These courses must be completed prior to enrollment in second-level courses, except Accy 297, which must be taken in the last semester of the program. All of these course requirements, except Accy 297, may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. First-level courses may not be taken to satisfy second-level requirements or electives.

**Second Level**  
 1. **Required Courses:** Accy 225, 261, 262, 263, 264, 265, 269. (Accy 225 may be replaced by another graduate-level accountancy course if the student has completed comparable work at another regionally accredited institution.)  
 2. **Electives:** Three elective courses are to be selected in consultation with the designated faculty advisor.

## Master of Urban and Regional Planning

The Master of Urban and Regional Planning is a professional degree program designed as preparation for a broad range of professional careers in both the private and public sectors. The 48-credit-hour course of study provides a broad education to develop competence in planning theory and methodology and to emphasize the analytical ability and creativity necessary for solving urban and regional problems. Emphasis is placed on the formulation of realistic planning solutions and the practice of urban and regional planning.

## Degree Requirements

1. A macroeconomics course completed at a regionally accredited college or university prior to admission or within the first two semesters of the program.
2. Core courses (27 credit hours): UPRE 201, 202, 203, 207, 211, 212, 215.
3. A field of concentration, with a minimum of 9 to 12 credit hours.
4. Six to nine credit hours of elective courses.
5. A minimum of three months full-time (or equivalent) supervised profes-

sional work experience in planning, with an acceptable written report approved by faculty advisor.

6. A written Master's Comprehensive Examination following completion of all course work.

7. A thesis (3 credit hours) based on the candidate's research; the thesis usually complements the chosen field of concentration.

While the typical program of study, including the thesis, comprises 48 credit hours, requirements may be reduced to a minimum of 45 credit hours, depending upon the student's background and professional experience.

### Fields of Concentration

Each student is required to develop a field in an area of professional specialization. The field of historic preservation requires a minimum of 9 credit hours; the fields of community planning and real estate development require a minimum of 12 credit hours.

**Community Planning**—The fundamental elements of community planning are explored in this field, including housing, community facilities, fiscal policy, urban economics, and neighborhood dynamics. Emphasis is on problem identification and analysis and on plan and program formulation. For those wishing to focus on design, course work may be chosen to include understanding of community needs and perceptions and development and application of aesthetic sensibilities and creative skills in problem solving.

**Historic Preservation**—This program is designed to foster an understanding of the historic attributes of architecture and landscape, from the extraordinary monument to the most ubiquitous of patterns; developing skills to document, assess, and protect our historic legacy, and acquiring a sensitivity to design and planning issues central to managing the forces of growth and change within historic context. Preservation is examined as process, involving a wide range of participants, that can vary in complexion, focus, and concrete goals. The ability to solve problems in preservation is emphasized over any set of administrative or political procedures.

**Real Estate Development**—This field is designed to provide interdisciplinary and applied studies for students preparing for a career in real estate development. The field combines the fundamental economic principles and concepts that govern the real estate investment and development process with those that emphasize the analysis of specific projects, including site requirements, physical relationships, holding capacity, market conditions, financial feasibility, and requirements, legal framework and constraints, and opportunities associated with the public sector and long-term community needs.

### Specialist in Health Services Administration

Students with a master's degree in an approved related field or with a master's degree and managerial experience may undertake studies leading to the degree of Specialist in Health Services Administration. This program serves people who plan to begin a career in management, policy-making, or planning in the field of health services or who wish to supplement previous graduate study in health services administration.

Most students with adequate preparation in health services administration or a related management field should be able to complete the requirements by taking a 30-credit-hour program of study. Those lacking specialized preparation will need additional course work, depending on career goals. Field experience assignments, if required, are in addition to the 30-credit-hour minimum.



Individual programs will be developed in consultation with a faculty advisor on the basis of the student's educational background, experience, and specific professional objectives.

All students must take at least one doctoral-level seminar in health services administration (HSMP 310 or 330) and complete a 3-credit-hour research project (HSMP 270). The remaining hours may be taken in health services management and policy or other appropriate disciplines.

### Doctoral Program

The degree of Doctor of Philosophy is offered in accountancy, business administration, health services administration, information and decision systems, management and organization, and public administration. The Committee on Doctoral Studies supervises all aspects of the program.

### Admission

The minimum admission requirement is a bachelor's degree from a regionally accredited college or university, preferably with a major appropriate to the proposed field of study. Most applicants have completed a master's degree in an appropriate field. Applicants whose degrees are in fields other than their proposed field of study are expected to obtain the necessary background either before or soon after admission to the program. Scores on the Graduate Record Examination or the Graduate Management Admission Test are required. However, applicants who have taken the Law School Admission Test or the Medical College Admission Test may submit these test scores for consideration. Under special circumstances, scores on the Miller Analogies Test may also be submitted. Applicants whose test scores are more than 10 years old are required to take or retake the Graduate Record Examination or the Graduate Management Admission Test. Applicants whose test scores are more than five years old are encouraged but not required to take or retake either of the tests. Arrangements to take the tests must be made with the Educational Testing Service. Students whose native language is not English must also submit the Test of English as a Foreign Language (TOEFL) scores with a total score of not less than 550.

The Doctoral Committee does not use specific cutoff points for grade averages and test scores. It carefully reviews each applicant's entire record and makes its selection on a competitive basis in keeping with enrollment limitations.

Admission to the doctoral program is granted for the fall semester and summer sessions only. Completed applications must be sent to the Office of Academic Advising and Student Services, School of Business and Public Management, George Washington University, Washington, D.C. 20052, by March 1 for the fall semester and summer sessions. Applicants are notified of their eligibility for admission four to six weeks subsequent to established dates for receipt of the completed application and all required supporting credentials.

### Plan of Study

The doctoral program consists of two major parts: the pre-dissertation stage and the dissertation stage. The objective of the pre-dissertation stage is to provide the student with the theoretical foundations and practices of the primary and supporting fields of study and with a command of the relevant qualitative or quantitative analytical methods. The objective of the dissertation stage is to have the student apply the obtained theoretical and practical knowledge and analytical methods to the resolution of a research problem. The research should be original and is expected to result in a contribution, either applied or theoretical, to the existing body of knowledge. The total program must be finished in seven years; only under very special circumstances can extensions beyond this time limit be

given by the Committee on Doctoral Studies. If a student is granted an extension beyond the seventh year (14 semesters), the student must register and pay for credit hours of Dissertation Research at the then-current tuition rate every semester until graduation.

The pre-dissertation stage is based on an individual study plan developed by the student under the guidance of the primary and supporting field advisors during the first academic year. In the study plan the student must state long-range professional objectives, all proposed academic activities, methods of evaluation, and a semester-by-semester schedule.

All students, regardless of the primary field of study, must include in their study plan Mgt 390, Philosophical Foundations of Administrative Research, and the multidisciplinary course, 311, Seminar: Public-Private Sector Institutions and Relationships. These courses should be taken during the first academic year after admission. Mgt 391, Methodological Foundations of Administrative Research, must be taken at the end of course work.

In addition to the evaluation methods proposed in the study plan, the primary and supporting field advisors evaluate the student's progress at the end of the first and second semesters after admission, and thereafter at the end of the spring semester of each academic year. A comprehensive evaluation of study plan activities for both the primary and supporting fields is the final process of the pre-dissertation stage.

As background, a student whose field is designated as Business Administration must demonstrate, either through prior academic experience or through the proposed content of the doctoral study plan, a working knowledge of the principal content areas of business administration.

Supporting fields may be chosen from other departments of the University. A student selecting a field outside of the School, however, must meet the academic and administrative requirements of the department involved.

For more detailed information on the program and its administration, see the *Handbook on the Doctoral Program*, available in the Doctoral Program Office.

## Special Programs

### International Institute for Health Services Administration

In recognition of special educational needs of students from other countries, the International Institute for Health Services Administration offers programs of instruction designed to meet these needs at either the degree or certificate level.

It is also equipped to enter into arrangements with principals of health systems in worldwide areas to assist in the preparation of teaching programs or the actual instruction of administrative personnel either abroad or at the University.

### Joint Master's and Juris Doctor Degree Program

In certain instances arrangements may be made for students to work concurrently toward both the Juris Doctor degree in the National Law Center and a master's degree in the School of Business and Public Management. Students must be admitted separately both to the National Law Center and to the School of Business and Public Management and must meet all requirements in each degree program. It is possible for a student to complete work for both degrees within four years.



## ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean M.A. East

Associate Deans H.R. Nau, J.R. Millar

### Introduction

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of George Washington University from 1965 to 1988.

### Academic Programs

The Elliott School offers graduate programs in international affairs, Latin American studies, East Asian studies, Russian and East European studies, security policy studies, and science, technology, and public policy. Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Course offerings draw heavily on the various academic departments of the University.

Graduate programs lead to the degree of Master of Arts. Students develop a higher level of competence in a world region or a discipline that focuses on a solid understanding of major historical and contemporary issues in international affairs, as preparation for professional employment in government or in international organizations, agencies, or business.

### The Degree of Master of Arts

The Elliott School offers degree programs leading to the Master of Arts in the fields of East Asian studies, international affairs, Latin American studies, Russian and East European studies, security policy studies, and science, technology, and public policy.

### Admission Requirements

Application forms are available from the Office of Graduate Admissions, Elliott School of International Affairs, George Washington University, Washington, D.C. 20052. Admission is normally for the fall semester only and may be for full- or part-time study. Admission decisions are made on a rolling basis, beginning in late February. Applications for admission must be submitted by February 1 for the following fall semester. January 15 is the deadline for applicants for fellowship awards and for admission applications from international students.

Admission to master's programs in the Elliott School is highly competitive. To be considered for admission, applicants must present a bachelor's degree from an accredited college or university. Previous academic performance, scores on the general test of the Graduate Record Examination, letters of recommendation, motivation, and professional experience are all considered in the selection process.

The following additional requirements pertain to all applicants from countries in which English is not an official language—Applicants are required to submit scores from the Test of English as a Foreign Language (TOEFL). The Test of

Written English (TWE) is also recommended. The minimum TOEFL score for admission to a graduate degree program is 550. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at George Washington University before registering. (Those who score 600 or more on the TOEFL and score 5 out of 6 on the TWE are exempted from EFL course work may be required, depending on the applicant's performance on the placement test.

**International Affairs**—The applicant's undergraduate program should include background courses corresponding to the undergraduate major in international affairs at this University or some other relevant social science program. In the case of major deficiencies in the social sciences or international relations, additional course work may be specified beyond the minimum requirements for the master's degree.

**East Asian Studies**—An undergraduate major in a pertinent field is required. For the concentration in Chinese language and literature, the undergraduate program should include 24 credit hours of Chinese language study.

**Latin American Studies**—The applicant's undergraduate program should include background courses corresponding to an undergraduate major in Latin American studies at this University, or equivalent. Majors in other fields may be considered for admission provided that undergraduate course work includes Spanish or Portuguese and sufficient course work in one of the following areas: anthropology, economics, geography and regional science, Hispanic literature, history, and political science.

**Russian and East European Studies**—An undergraduate major in a pertinent field is required. The undergraduate program should include the following courses, or equivalent: Hist 145, 146; PSc 131 or 168; Slav 1-2 and 3-4, or 5-6.

**Science, Technology, and Public Policy**—Undergraduate majors in a social, life or physical science, or in engineering are eligible for admission, although those lacking adequate preparation in relevant social sciences, particularly economics, may be required to take additional courses; such requirements will be indicated in the letter of admission to the program.

**Security Policy Studies**—An undergraduate background similar to that specified above for International Affairs would be appropriate. Work experience in the military or national security fields might compensate in part for inadequate academic preparation. A background in economics or quantitative analysis would also be helpful.

#### **Readmission**

A graduate student who has not been continuously enrolled, or on approved leave of absence or inactive status, must file an application for readmission one semester before planning to return to school.

#### **Regulations**

See Fees and Financial Regulations; University Regulations.

#### **Attendance**

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.



### Withdrawal

Withdrawal without academic penalty after the end of the fifth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

### General Requirements

Programs leading to the Master of Arts degree vary in their requirements. Some programs offer an option that requires a minimum of 24 credit hours of approved graduate work plus the successful completion of a thesis; the student must register for 6 credit hours of thesis research (IAff 299-300). Other programs require a minimum of 36 credit hours of graduate course work and may include a thesis. The Security Policy Studies program does not have a thesis option; the Chinese language and literature concentration of the East Asian Studies program requires the thesis option. Under all programs, course work is taken in order to prepare for the Master's Comprehensive Examinations.

Candidates for the degree of Master of Arts are required to submit an advisor-approved plan of studies (comprehensive fields, supporting course work, tool requirement, etc.) to the office of the dean by the end of the first semester in residence. Master's degrees are awarded by vote of the faculty after the student has completed the required course work and an acceptable thesis (if one is elected), has satisfied the foreign language or tool requirement, and has passed the Master's Comprehensive Examinations.

Under special circumstances second-group courses (numbered 101-200) may be counted toward the master's degree when registration for graduate credit has been approved at the beginning of the course by the curriculum advisor, the instructor, and the dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course. Normally, no more than 6 credit hours of second-group courses may be taken for graduate credit in the 30-credit-hour program, and no more than 9 credit hours may be taken for graduate credit in the 36-credit-hour program. (An exception to this rule is the case of students who select one or more fields in history; they may take 9 hours of second-group courses in the 30-hour program and 12 in the 36-hour program.) No work counted toward a bachelor's degree may also be counted toward a master's degree.

All master's degree candidates must complete degree requirements within five years of their admission to the program. A student who is unable temporarily to continue the plan of studies may request a leave of absence not to exceed one year. Extensions beyond the five-year period may be granted in exceptional circumstances, but the student will be required to register and pay for 6 credit hours of Reading and Research each semester.

No credit is granted for work done in absentia or without formal instruction, except for the thesis, which may be completed in absentia with the permission of the curriculum advisor and the dean. No more than 6 credit hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

### Curriculum Requirements

Curriculum requirements for the master's programs are listed under the appropriate heading in Courses of Instruction—International Affairs; East Asian Studies; Latin American Studies; Russian and East European Studies; Science, Technology, and Public Policy; and Security Policy Studies.

### Tool Requirements

In most degree programs, a candidate for the degree of Master of Arts must demonstrate a reading knowledge (certified by the relevant language department) of a modern foreign language that has an appropriate literature for the study of the field. Students in regional programs must demonstrate their ability in a language appropriate to the study of the specific region. If a student selects a language not offered by the University, a testing fee of \$50 will be charged. A master's degree candidate whose native language is not English may select English to fulfill the requirement with the approval of the advisor and the dean. The examination, which will test high-level reading and writing proficiency, is administered by the English as a Foreign Language program.

Candidates in the fields of security policy studies and science, technology, and public policy may substitute statistics for a foreign language. This requirement may be met by demonstration of proficiency (i.e., grades of B or better) at the level of Stat 105, 112, or 183. The tool requirements of the science, technology, and public policy field may also be fulfilled by proficiency in PAD 296.

Candidates in international affairs may petition the dean to substitute statistics for a foreign language. The primary basis for approving such petitions will be the relevance of the statistical skills to the student's thesis research.

The language or tool examination should normally be taken before the student has completed the first 15 hours of work; it must be taken before the comprehensive examination. No student may take the language or tool examination more than three times. Courses taken to fulfill the tool requirement are not counted on the credit-hour requirement for a master's degree.

### Master's Comprehensive Examinations

In addition to course examinations, the candidate must pass written Master's Comprehensive Examinations covering the chosen fields of study. Examinations are scheduled twice a year (in November and April) and should be taken during the last semester of course work or shortly after the completion of all prescribed course work. The student must have a 3.0 grade-point average in order to take the Comprehensive Examinations. If there is a lapse of time between completion of course work and the examination, the student must be enrolled continuously during this period. It should be understood that course work constitutes only partial preparation for the Master's Comprehensive Examinations. Each student is expected to pursue a program of additional reading in each of the selected fields, in accordance with the advice of the faculty member responsible for instruction in that field. A student who fails to pass any part of the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted.

### Scholarship Requirements

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; F, Fail; CR, Credit; I, Incomplete; IP, Progress; W, Authorized Withdrawal; and Z, Unofficial Withdrawal. Courses taken to satisfy degree requirements cannot be taken on a Credit (CR) basis, with exception of Thesis Research.

Graduate students are required to maintain a minimum cumulative grade point average of 3.0. Students whose cumulative grade point average falls below 3.0 at any time after having completed at least 9 credit hours will be given an additional semester in which to raise the grade point average above 3.0. Those who fail to bring their grade point average over 3.0 at the end of the additional semester will not be allowed to continue in the program. For part-time students



and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 9 credit hours have accrued.

A master's candidate who receives a grade of F is required to present cause for consideration by the Dean's Council as to why he or she should be allowed to continue in the program of studies.

Whenever a grade has not been assigned, the symbol I (Incomplete) or W (Authorized Withdrawal) will be recorded. The symbol I indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. Except for thesis research courses, an Incomplete cannot be made up after the lapse of one calendar year. An Incomplete that is not made up by the end of one calendar year remains as a grade of I on the student's record. An Incomplete cannot be removed by reregistering for the course. No student will be permitted to register for courses or take the Comprehensive Examinations if there are more than two Incompletes outstanding on the record.

A student who fails to meet the established deadlines for completion of course work or other elements of the program (e.g., comprehensive examinations) and is granted an extension may be required by the dean and the Dean's Council to register for 3 credit hours of graduate Reading and Research for each semester that the work is delinquent.

### The Thesis

The thesis subject should be selected as early as possible so as to permit effective integration with the course work. A student will not be permitted to register for Thesis Research (IAff 299-300) until the thesis subject has been formally submitted to the dean's office. Some programs, such as international affairs, set specific requirements in order to qualify to write a thesis. The subject must be approved by the member of the faculty under whom the thesis is to be written, a second member of the faculty who will serve as a reader, and the student's program director. The thesis in its final form must have the approval of the thesis director and one other reader, and two copies must be presented to the dean by the student no later than the date announced in the University Calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the dean's office.

Payment of tuition for thesis research entitles the candidate, during the period of registration, to the advice and direction of the thesis director and the other reader. In case a thesis is unfinished, the student must maintain continuous enrollment and is allowed one calendar year to complete it. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

### Special Programs

#### Joint Master of Arts and Juris Doctor Degree Program

The Elliott School of International Affairs cooperates with the National Law Center in offering a program of study leading to the degrees of Master of Arts and Juris Doctor. A student must be accepted for admission by both the Elliott School and the National Law Center. Applications should be made separately but at the same time. Both the Elliott School and the Center should be notified that the student is interested in the combined program. The student will be admitted to the Elliott School for the academic year following the first year of study at the National Law Center, since the National Law Center stipulates that the first year of course work for the Juris Doctor degree must be taken as a unit.

The Master of Arts degree program normally consists of the 30-credit-hour program that includes a thesis. The student selects a major offered by the School

and fulfills all of the requirements for the Master of Arts degree as well as fulfilling the requirements for the Juris Doctor degree. Up to 6 credit hours of credit for course work completed as part of the Juris Doctor curriculum are related to the student's degree program may be approved for transfer toward the Master of Arts degree. (Some of the course work required for the Master of Arts degree program may be applicable toward the Juris Doctor degree requirements. Students will be registered in both the Elliott School and the National Law Center and must maintain this concurrent registration until all degree requirements have been completed. All work for this combined degree program must be completed in five years, unless an extension of time is granted by the dean.

#### **Institute for Sino-Soviet Studies**

The Institute for Sino-Soviet Studies provides a program of specialized graduate study and research within the Elliott School of International Affairs. Courses taught by members of the Institute are drawn from a variety of academic areas and thus provide an interdisciplinary approach to the study of the Soviet Union, Eastern Europe, and East Asia. Faculty members conduct formal seminars and reading courses in economics, geography, history, language and literature, law and political science. The Institute also sponsors a wide variety of seminars, conferences, and speaker programs that involve scholars from all parts of the world.

Courses taught by members of the Institute are intended especially for students preparing for the Master of Arts in the fields of East Asian studies, international affairs, and Russian and East European studies in the Elliott School, and for Graduate School students in the fields of economics, history, or political science with specialization in Sino-Soviet studies.

#### **Center for International Science and Technology Policy**

The Center, established in 1970 as the Graduate Program in Science, Technology and Public Policy, has become a locus for research and the exchange of information and ideas. In addition to overseeing the M.A. program in this area, the Center organizes seminars and meetings, sponsors research, and hosts visitors from elsewhere in the United States and abroad.

#### **Space Policy Institute**

The George Washington University has established the Space Policy Institute as a center of objective competence in an important area of national and international activity. The Institute focuses on policy issues related to civilian space activities and their interactions with national security space programs. It conducts research on space policy issues and organizes seminars, symposia, and conferences.



## **DIVISION OF CONTINUING EDUCATION**

Acting Dean A.O. Smith

Assistant Deans B.J. Moreland, G.M. Logan

### **Introduction**

The Division of Continuing Education administers the University's off-campus credit courses and degree programs. The Division offers noncredit certificate programs, courses, and workshops, and conferences and institutes. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community.

The Division works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study for continuing education students. The Division offers courses at the Crystal City Education Center in Arlington, Virginia, and other off-campus locations in the District of Columbia and suburban Maryland and Northern Virginia. The Division also offers, through its Hampton Roads Center, certificate and graduate degree programs in various disciplines at locations in the Hampton, Norfolk, and Virginia Beach area. A wide range of seminars and workshops is available to organizations and individuals from the professional community at several locations, including the new Northern Virginia campus in Loudoun County.

The academic standards of the University are maintained in off-campus credit courses. All programs offered through the University's off-campus programs and administered by this Division are approved through the procedure authorized by the Board of Trustees and the Charter granted by the Congress of the United States. Degrees are granted through the faculties of the degree-granting schools and colleges of the University. Credit earned through off-campus study conforms to academic standards throughout the University. All Division off-campus offerings in Maryland are approved by the Maryland State Board for Higher Education; those in Virginia are approved by the Commonwealth of Virginia Council of Higher Education.

Except as outlined below, all general University regulations apply to students in the Division of Continuing Education. In addition, Division students may be subject to special requirements of the school or college through which they are taking courses.

### **Admission as a Degree Candidate in Off-Campus Programs**

Students wishing to be admitted as candidates in an off-campus degree program may obtain application forms from the school concerned, the Division of Continuing Education, one of the University's off-campus representatives, or the education officer of their agency or installation.

### **Nondegree Students**

Off-campus credit courses may be taken by nondegree students who meet the prerequisites prescribed by the department concerned. Formal University admission is not required at the time of initial registration in off-campus courses. Those students who plan eventual degree candidacy should note that each school places a specific limit on the number of credit hours taken in nondegree status that can be applied toward a degree.

### Degree Programs

The following degree programs are offered off campus.

#### Graduate School of Arts and Sciences\*

Master of Arts in the fields of administrative sciences (human resources management and organizational management), criminal justice (crime in commerce and security management), legislative affairs, telecommunication  
Master of Science in the field of administrative sciences (management information systems)

Master of Forensic Science

#### School of Engineering and Applied Science†

Master of Engineering Management

Master of Science with major fields in electrical engineering (communications), computer science, information management, operations research  
Professional Degrees (Engineer and Applied Scientist)

#### School of Education and Human Development‡

Master of Arts in Education and Human Development in the fields of curriculum and instruction, early childhood special education, higher education, human resource development, supervision, transitional special education  
Master of Education in the field of secondary education

Education Specialist in the fields of administration, higher education, human resource development

#### Elliott School of International Affairs‡

Master of Arts in the fields of security policy studies, Russian and East European studies

### Center for Career Education and Workshops (CCEW)

CCEW provides a broad spectrum of services focusing on innovative, nontraditional, career-oriented education. Among CCEW programs are noncredit, graduate-level career certificate programs to prepare the legal assistant, publication specialist, landscape designer, fund raising administrator, administrative manager, association executive, information systems specialist, public relations professional, and Washington representative. Other programs are designed to prepare the certified employee benefit specialist, certified financial planner, and credit administrator. Credit courses and test review courses (for CLEP, EIT, PS, GMAT, GRE, LSAT, MAT, MCAT, and Basic Real Estate) are offered as well.

Workshops and short-term courses provide the opportunity for individuals to be informed of the innovations in their fields. Courses focus on advances in computer technology and train participants to increase personal effectiveness, improve managerial expertise, reinforce leadership ability, identify practical decision-making skills, broaden understanding of systems and concepts, and develop understanding of financial, political, and social strategies. The Professional Development Program, designed to enhance the skills, productivity, and job satisfaction of an organization's employees, can provide these workshops, credit courses, and noncredit courses on site or through interactive television.

CCEW offers undergraduate certificate programs that combine academic courses offered by Columbian College of Arts and Sciences with skill development workshops. The programs include Supervisory Specialist, and Communication Studies.

The Center is the site of the University's Continuing Education for Women (CEW) program, which has provided counseling and educational services for women in transition since 1964. Participants benefit from many CEW programs.

\* For program information, see the field concerned under Courses of Instruction.  
† For program information, see the section on the School of Engineering and Applied Science.  
‡ For program information, see the section on the School of Education and Human Development.



which currently include group and individual counseling services accredited by the International Association of Counseling Services, Inc. CEW also offers a series of special-interest courses focusing on issues confronting women. For a complete listing of services, courses, and programs, see the CCEW schedule of classes.

### Office of University Students

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session, except in special circumstances as approved by the dean.

### Entrance Requirements

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension.

Applications for admission through OUS for a fall or spring semester should be obtained from and returned to the Office of Admissions. There is no application fee. For information on registration, please refer to the *Schedule of Classes*.

### Regulations

See Fees and Financial Regulations; University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations concerning attendance and withdrawal stated under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.

Last day to drop a class for credit or to withdraw from the University—end of the seventh week of classes.

Equivalent amounts of time apply to the summer sessions.

### Academic Work Load

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the dean.

### Scholarship Requirements

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is

available in the office of the dean. All grades received in OUS remain on the record; scholarship requirements are based on the total record.

**Grades**—See University Regulations. There is no limitation on the number of courses that may be taken on a pass/no pass basis in OUS; however, there may be a limit on the number that can be transferred to fulfill degree requirements.

#### **Incomplete/Authorized Withdrawal**

Conditions under which the grades of I (Incomplete) and W (Authorized Withdrawal) may be assigned are described under University Regulations.

**Changing an Incomplete**—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of I on the student's record.

#### **Change in Program of Studies**

**Change Within the Office of University Students**—A student may not change status to that of auditor except with the approval of the dean (see *Withdrawal under University Regulations*).

**Transfer Within the University**—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester at OUS or upon request from the college or school to which the student is seeking admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

#### **Office of Conferences and Institutes**

The Office of Conferences and Institutes increases the visibility of faculty research by administering conferences, sponsored projects, and training programs that attract national and international scholarly audiences to the University. The Office's conference management services provide support that may include program development, advisory board coordination, budget planning and administration, promotion, site selection, transportation, registration, and on-site management. This administrative partnership with academic departments allows the faculty to focus on the professional and scholarly aspects of meetings. Cooperative programs have been held with such varied organizations as the National Science Foundation, U.S. Information Agency, District of Columbia Bar Association, Department of the Treasury, Institute of Electrical and Electronic Engineers, National Endowment for the Humanities, and embassies of foreign missions.

#### **Science Communication Studies**

Science Communication Studies facilitates the communication of scientific information and provides research and information services. Its current focus is to provide a range of scientific information services to NASA's Life Sciences Division, which conducts research to ensure the safety and well-being of humans in space, and to make use of the space environment to answer basic scientific questions. Science Communication Studies maintains databases of published sciences literature. Scientific publications, literature searches, and analyses of the scientific literature are also prepared. Areas of special expertise include plant and animal experimentation in space flights, the Soviet biomedical space research program, space-human factors, and exobiology—the study of the origin and evolution of life in the universe.



### Other Noncredit Courses and Programs

In addition to the noncredit offerings of the Division, the University offers a variety of noncredit professional development courses and programs through the School of Business and Public Management (Continuing Professional Education Office), the School of Engineering and Applied Science (Continuing Engineering Education Program), and the School of Education and Human Development (Center for Research and Services).



### SUMMER SESSIONS

Courses are offered during the summer by all degree-granting divisions of the University: Columbia College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Medicine and Health Sciences, the National Law Center, the School of Engineering and Applied Science, the School of Education and Human Development, the School of Business and Public Management, and the Elliott School of International Affairs. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours.

Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate college or school within the University. Those who do not wish to work toward a degree at the University may apply through the Office of University Students and are subject to its entrance requirements and regulations stated above. For a complete statement concerning summer term work, see the Summer Sessions Announcement.



## RESEARCH CENTERS AND INSTITUTES

The University recognizes that research contributes significantly to the academic stature, achievement, and capability of the faculty in fulfilling their responsibilities as teachers and public servants. To that end, the University seeks to ensure the close integration of research and teaching, including the employment of students in sponsored projects and the use of research facilities for instructional purposes. The following units are presently chartered for these purposes; the head of each unit is indicated in parentheses.

Biostatistics Center (J. Lachin III)  
Center for Digestive Diseases (H. Fromm)  
Center for Health Policy Research (Budetti)  
Center for High Technology (H. Liebowitz)  
Center for History in the Media (Becker, Seavey)  
Center for International Science and Technology Policy (J. Logsdon)  
Center for Social Policy Studies (S. Levitan)  
Center for the Study of Education and National Development (J. Bosworth)  
Center for Washington Area Studies (J. Henig)  
Division of Research, Psychiatry, and Behavioral Sciences (D. Reiss)  
ERIC Clearinghouse on Higher Education (J. Fife)  
First Federal Congress Project (C. Bickford)  
Institute for Artificial Intelligence (B. Silverman)  
Institute for Disease Prevention (O. Alabaster)  
Institute for Information Science and Technology (W. Kahn)  
Institute for Management Science and Engineering (W. Marlow)  
Institute for Medical Imaging and Image Analysis (R. Allman, M. Lorenz)  
Institute for Reliability and Risk Analysis (N. Singpurwalla)  
Institute for Sino-Soviet Studies (J. Millar)  
Institute for the Study of Fatigue, Fracture, and Structural Reliability  
(H. Liebowitz)  
Institute for Technology and Strategic Research (H. Liebowitz)  
Institute for Urban Development Research (D. McGrath)  
Intergovernmental Health Policy Project (R. Merritt)  
International Water Resources Institute (K. Mahmood)  
Joint Institute for the Advancement of Flight Sciences (H. Liebowitz)  
Labor Management Institute (B. Burdetsky, M. Lovell)  
Lipid Research Clinic (J. LaRosa)  
National Health Policy Forum (J. Jones)  
Space Policy Institute (J. Logsdon)  
Wilson Genetic Counseling Center (J. Larsen)



## COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and special interdepartmental programs. The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

### Hours of Instruction

Classes are scheduled in the morning, afternoon, and evening. Evening and daytime sections of the same course are identical, are taught by the same staff of instructors, and carry the same amount of credit.

### Explanation of Course Numbers

**First-Group Courses**—Courses numbered 1–100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

**Second-Group Courses**—Courses numbered 101–200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the Dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101–200 may not be taken for graduate credit.

**Third-Group Courses**—Courses numbered 201–300 in the Graduate School of Arts and Sciences, the School of Business and Public Management, the Elliott School of International Affairs, and the School of Education and Human Development are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.00 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Nondegree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management.

**Fourth-Group Courses**—Courses numbered 301–400 in the Graduate School of Arts and Sciences are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301–400 in the School of Business and Public Management are primarily for doctoral students; the courses are open to selected master's students upon approved petition. In the School of Education and Human Development fourth-group courses, numbered 301–400, are limited to graduate students with master's degrees from accredited institutions.

**Fifth-Group Courses**—Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s are taught by scholars who hold appointments as University Professors. The 700 numbers do not indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. The course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration. 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective colleges.

### Key to Abbreviations

The following abbreviations are used for course designations:

Accy	Accountancy	Kor	Korean
AdSc	Administrative Sciences	Law	Law
AmCv	American Civilization	Ling	Linguistics
Anat	Anatomy	Mgt	Management Science
Anes	Anesthesiology	MLOM	Marketing, Logistics, and Operations Management
Anth	Anthropology	Math	Mathematics
ApSc	Applied Science	ME	Mechanical Engineering
Art	Art	Med	Medicine
ArTh	Art Therapy	Micr	Microbiology
AM	Association Management	MSId	Museum Studies
Bioc	Biochemistry	Mus	Music
BiSc	Biological Sciences	NSc	Naval Science
Chem	Chemistry	NSur	Neurological Surgery
Chin	Chinese	Neur	Neurology
CE	Civil Engineering	Ob&G	Obstetrics and Gynecology
Clas	Classics	OR	Operations Research
Comm	Communication	Opht	Ophthalmology
CpMd	Computer Medicine	Orth	Orthopaedic Surgery
CSci	Computer Science	Path	Pathology
Cnsl	Counseling	Peds	Pediatrics
Derm	Dermatology	Phar	Pharmacology
Econ	Economics	Phil	Philosophy
Educ	Educational Leadership	Phys	Physics
EE	Electrical Engineering	Phyl	Physiology
EMed	Emergency Medicine	PCm	Political Communication
EMgt	Engineering Administration	PPay	Political Psychology
EngS	Engineering Science	PSc	Political Science
Engl	English	Port	Portuguese
EFL	English as a Foreign Language	Pchi	Psychiatry and Behavioral Sciences
E&RP	Environmental and Resource Policy	Psyc	Psychology
EnHe	Environmental Health	PAd	Public Administration
Envr	Environmental Studies	PubH	Public Health
ExSA	Exercise and Sport Activities	PPol	Public Policy
Fina	Finance	Rad	Radiology
ForS	Forensic Sciences	Rel	Religion
Fren	French	Rom	Romance Literatures
Gnet	Genetics	Rmn	Romanian
Geob	Geobiology	SLP	Service-Learning Program
Geog	Geography and Regional Science	Slav	Slavic Languages and Literatures
Geol	Geology	Soc	Sociology
Ger	Germanic Languages and Literatures	Span	Spanish
Gern	Gerontology	SpEd	Special Education
HCS	Health Care Sciences	SpHr	Speech and Hearing
HEMMP	Health Services Management and Policy	Stat	Statistics/Computer and Information Systems
Hisl	History	SMPP	Strategic Management and Public Policy
Honr	Honors	Surg	Surgery
HmKn	Human Kinetics	TrEd	Teacher Education
HRID	Human Resource Development	TCom	Telecommunication
HmSr	Human Services	TrDa	Theatre and Dance
Hmn	Humanities	T&T	Travel and Tourism
Idis	Interdisciplinary Courses	Univ	University
IAH	International Affairs	UPRE	Urban Planning and Real Estate Development
IBus	International Business	Urol	Urology
Ital	Italian	WStu	Women's Studies
Japn	Japanese		
Jour	Journalism		



### Credit Hours

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3-3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

### Time of Course Offerings

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the *Summer Sessions Announcement* for additional summer offerings. A *Schedule of Classes* is published each fall and spring semester to provide information concerning the time of course offerings.

### ACCOUNTANCY

Professors A.J. Mastro, F.C. Kurtz, C.M. Paik, M.G. Gallagher, J. Hilmy (Chair), F.W. Segel  
Associate Professors D.R. Sheldon, L.G. Singleton  
Assistant Professors K.E. Smith, L.C. Moersen, P.R. Witmer, C.J. Lin, S.M. Moody, T. Verghese

See the School of Business and Public Management for programs of study in accountancy leading to the degrees of Master of Accountancy, Master of Taxation, and Doctor of Philosophy.

#### 201 Financial Accounting (3)

The role of accounting in the decision-making process of external parties, the understanding, interpretation, and implementation of financial accounting. (Course equivalent: a similar graduate financial accounting course, or Accy 51-52, or two similar undergraduate courses.) (Fall and spring)

Kurtz, Singleton

#### 202 Management Accounting (3)

The role of accounting in the decision-making processes of management: understanding of how accounting influences resource allocation decisions in the organization. Prerequisite: Accy 201. (Fall and spring)

Paik, Moody

#### 211 Business Law for Accountants (3)

A study of the legal process and the principles and precepts of business law within the context of the political and legal environment of business. Corporations, partnerships, securities, the debtor-creditor relationship, trusts, wills, and the legal liability and ethical standards of the accountant. (Fall and spring)

Moersen

#### 221 Cost and Budget Analysis (3)

An advanced cost analysis course, with emphasis on comparative costs, quantitative techniques for cost data, managerial reporting systems, and manufacturing efficiency studies. Prerequisite: Accy 201 and 202. (Spring)

Sheldon

#### 225 Financial Reporting Standards (3)

A critical understanding of the Financial Accounting Standards Board Pronouncements (Standards) and the Security and Exchange Commission-Accounting Series Releases. Prerequisite: Accy 201 and 202. (Fall and spring)

Segel, Sheldon

Segel, Hilmy

#### 232 Accounting Theory (3)

Alternative approaches to structuring a financial accounting theory and analysis of the various theoretical interpretations espoused in the process of formulating accounting standards. Prerequisite: Accy 225 or permission of the instructor. (Spring)

#### 242 Business Income Taxation (3)

Federal tax concepts applicable to individuals, partnerships, fiduciaries, and corporations; emphasis on recognition of tax consequences attached to common business transactions and on tax planning. Not open to Master of Accountancy or Master of Taxation candidates. (Fall and spring)

Gallagher

- 251 Accounting for Multinational Corporations (3)**  
A study of international accounting standards with emphasis on accounting for foreign conversion requirements compatible with domestic accounting consolidation standards. Prerequisite: Accy 201. (Fall and spring) Hilmy
- 255 Business Combinations and Not-for-Profit Organizations (3)**  
Corporate concepts, business combination policies, including FASB, SEC, AICPA business combination pronouncements. Structure analysis of combined and consolidated financial statements; accounting for not-for-profit and governmental organizations. Prerequisite or (with approval of instructor) concurrent registration: Accy 225. (Fall) Hilmy, Eggleston
- 261 Federal Income Taxation (3)**  
A study of federal income taxation, covering gross income, deductions and credits, sales and other disposition of property, capital gains and losses, and timing. (Fall and spring) Gallagher
- 262 Federal Income Taxation of Partnerships (3)**  
Federal income taxation of partnerships, formation, operation, distribution, and transfer of partnership interests. Prerequisite: Accy 242 or 261. (Spring) Smith
- 263 Federal Income Taxation of Corporations (3)**  
A study of federal income taxation of "C" and "S" corporations, covering formation, capital structure, nonliquidating distributions, complete liquidations, corporate accumulations, and the alternative minimum tax. Prerequisite or concurrent registration: Accy 242 or 261. (Fall and spring) Gallagher
- 264 Federal Taxation of Estates and Gifts (3)**  
A study of estates, gifts, and trusts covering gross estates, state transfer taxes, valuation problems, planning estate liquidity, complex trusts. Prerequisite: Accy 242 or 261. (Spring) Smith
- 265 Tax Practice and Procedure (3)**  
A study of federal tax practice and procedure, including organization of the IRS, ethical responsibilities, statute of limitations, examination of returns, claims for refund, penalties, and tax rulings. Prerequisite or concurrent registration: Accy 261. (Fall) Smith
- 266 Corporate Reorganizations and Affiliations (3)**  
Advanced study of corporate taxation: corporate reorganizations, multiple corporations, consolidated returns, and carryover of tax attributes. Prerequisite: Accy 263. (Spring) Smith, Gallagher
- 267 International Taxation (3)**  
A comparative analysis of the tax policies of countries that play a significant role in the international trading system. Prerequisite: Accy 201. (Spring) Vee
- 268 Deferred Compensation (3)**  
A study of tax aspects of deferred compensation arrangements, including qualified pension, profit-sharing, and stock bonus plans; retirement plans for self-employed individuals; individual retirement accounts; and stock options. Prerequisite or concurrent registration: Accy 261. (Spring) Gallagher, Smith
- 269 Tax Research and Planning (3)**  
A study of the legislative, administrative, and judicial sources of federal tax law. Emphasis on the use of tax research tools in locating, interpreting, and communicating tax law and on the complementary relationship between legal research and quantitative decision making. Prerequisite or concurrent registration: Accy 261. (Fall) Kurtz, Winner
- 275 Contemporary Auditing Theory (3)**  
Study of advanced independent (external) and internal auditing concepts, operational auditing, application of statistical sampling to auditing, audit of electronic data processing systems, computer applications, ethics. Prerequisite: Accy 225. (Spring) Segel, Vengrove
- 282 Accounting Information Systems and EDP (3)**  
Development and application of accounting system theory, including analysis, design, and implementation. Integration of electronic data processing accounting systems, and management information systems. Prerequisite: Accy 201. (Fall) Segel
- 290 Special Topics (3)**  
Experimental offering; new course topics and teaching methods. May be repeated once for credit. (Fall and spring) Smith



- 291 Financial Statement Analysis (3)** Hilmy  
Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors; establishing firms' business profiles; balance-sheet restructuring and the identification of financial and accounting correction measures from financial statements. Prerequisites: Accy 201. (Fall and Spring)
- 297 Professional Accountancy and Business/Government Policy (3)** Sheldon, Mastro  
A study of the development process of professional accounting standards through examination of the socioeconomic, political, legal, and management process. Management policy concerns for alternatives in the selection of accounting standards. Prerequisite: Master of Accountancy or Master of Taxation status. (Fall and Spring)
- 298 Directed Readings and Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.
- 391 Doctoral Seminar (arr.)** Sheldon, Paik  
Reasoning and research in technical areas of accounting, theoretical issues and their application to practice, conceptual themes in professional literature, comparative accounting research analyses. (Fall and Spring)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to doctoral candidates. May be repeated for credit.

## ADMINISTRATIVE SCIENCES

Professors J. Zeidner (Director), B. Cherian  
Professorial Lecturers A. Adams, J. Allen, J. Baker, C. Chambers, H. Eskew, J. Harper,  
O. Jacobs, E. Johnson, J. Robins, R. Sadacca, M. Sashkin, D. Harris  
Associate Professors M. Donnell, K. Klenke  
Associate Professorial Lecturers R. Belous, J. Georgatos, B. Kutnick, T. Rosen, L. Tanner, R.  
Manning, J. Hanson  
Assistant Professorial Lecturers W. Camara, M. Rumberg, P. Gardner  
Instructor E. Bailey  
Lecturer M. McComb

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Arts and Master of Science in the field of administrative sciences. The program has been designed for public and private sector professionals who wish to increase their managerial competence and to improve their career potential. The program provides knowledge and skills in the social, behavioral, quantitative, and information sciences.

**Master of Arts in the field of administrative sciences—Prerequisite: a bachelor's degree with a B average from an accredited college or university**  
Required: the general requirements stated under the Graduate School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. For the core curriculum, the following courses are required: AdSc 209, 221; Econ 217; Psyc 244, Stat 104. A student may specialize in human resources management or organizational management. The human resources management track requires AdSc 211, 212, 213, 214, 220, 222, 223. The requirements for the organizational management track are Psyc 245, 246, 260; AdSc 215, 216, 217, 240.

**Master of Science in the field of administrative sciences—Prerequisite: a bachelor's degree with a B average from an accredited college or university.**  
Required: the general requirements stated under the Graduate School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. For the core curriculum, the following courses are required: AdSc 209, Econ 217; OR 233, Psyc 244, Stat 104. The student specializes in management information systems. The management information

systems track requires seven of the following courses, chosen with faculty approval: AdSc 201, 202, 203, 205, 206, 207, 208, 219, 221, 225.

- 201 Principles of Management Information Systems (3)**  
An overview of the management information systems specialty track. Integration of management, information, and systems concepts into a unified framework. Management information systems development, design, implementation, and evaluation strategies.
- 202 Database Management and Operating Systems (3)**  
Fundamental concepts of operating systems and database management systems that serve as the foundation for information system design and development. Dynamic storage management, virtual memory process management, control languages, and systems routines. Prerequisite: AdSc 201 and the administrative sciences core curriculum except OR 233.
- 203 Data Communications and Networking (3)**  
Advanced concepts in analysis and development of computer-based information systems. Distributed data processing techniques and local and network development of telecommunication procedures. Implementation strategies used in the design of management decision-making systems. Prerequisite: AdSc 201 and the administrative sciences core curriculum except OR 233.
- 205 Decision Support Systems (3)**  
Analysis of frameworks, techniques, and tools for assisting management in the decision-making process. Hardware and software limitations of alternative approaches; anticipated technological improvements. Computer-based decision-making aids and simulations. Effective implementation of decision support systems. Prerequisite: AdSc 202, 203; OR 233.
- 206 Artificial Intelligence and Expert Systems (3)**  
Principles of artificial intelligence, including applications in robotics, natural language programs, and advanced computer input-output devices. Analysis of various expert systems, including tools and generators, classification versus diagnostic type systems. Development of the knowledge base and role of the knowledge engineer. Prerequisite: AdSc 202 and 203.
- 207 Information Systems Design (3)**  
Introduction to the design and analysis of information systems. The system development life cycle, analysis of requirements, design of logical systems, analysis and design of user interfaces, system documentation and specification. Planning for system implementation, evaluation, and maintenance. Prerequisite: AdSc 205.
- 208 Principles of Information Resource Management (3)**  
Basic principles of information resource management, including the use and impact of information in organizations; the relationship between information, knowledge, and management; end-user development of information systems; management of technology in an information economy. Prerequisite: AdSc 201, 203.
- 209 Management Systems (3)**  
An overview of management systems using the systems approach to management and problem solving; understanding long-range planning, management of complex projects using computer systems, use of work breakdown structures, critical-path planning systems and network analysis; cost-effectiveness analysis; program evaluation.
- 211 Psychology of Personnel Management (3)**  
An overview of the human resources management, examining a unified human resources management program, including integration of human resources planning, job analysis, employee selection, placement, training, performance evaluation, compensation management, and management information systems. Psychological theories underlying major personnel systems.
- 212 Current Issues in Personnel Testing and Selection (3)**  
Psychometric, legal, and organizational issues in personnel employment testing and selection; reliability and validity of selection instruments, and the use of selection systems. The legal environment, including test fairness in selection, adverse impact, and statistical models of test fairness and specific selection techniques. Prerequisite: Stat 104 and AdSc 211.



- 213 **Managerial Leadership, Motivation, and Work** (3)  
Analysis of leadership behavior and managerial activities. Synthesis of major theories of leadership, including trait, behavior, situational, and power-influence. Synthesis of motivational theories, including acognitive and cognitive perspectives. Application of theories at various levels of formal organizations beyond the interpersonal perspective. Prerequisite: AdSc 211.
- 214 **Personnel Training and Performance Appraisal Systems** (3)  
Management training programs and training evaluation techniques. Performance appraisal techniques, appraisal systems, relationship of rewards to performance, and the appraisal interview. Training and rating systems that satisfy legal requirements and stimulate employee productivity. Prerequisite: AdSc 212.
- 215 **Current Issues in Organizational Design** (3)  
Analytical framework for the design of complex organizations, including the hierarchical bureaucratic, functional, and matrix structures. Examination of organizational technologies, control and boundaries, including design approaches emanating from Europe, Japan, and the United States, drawing on system theory and moving toward broader organizational design issues.
- 216 **Theories and Management of Planned Change** (3)  
A systems view of organizational change and development, including intervention strategies, data collection diagnosis, and the integration and management of system-wide organizational change.
- 217 **Productivity and Human Performance** (3)  
Definitions and measurement of individual, team, and organizational productivity, effectiveness, and efficiency. Models for the analysis of organizational and individual productivity and productivity growth in industrialized nations. Techniques for increasing productivity.
- 218 **Design of User-Computer Interface** (3)  
Study of user-computer interaction. The theoretical bases of user-computer interaction and the integration of research findings into guidelines for systems developers and users. Environmental factors, user variables, help functions, system design, and multiple users. Prerequisite: AdSc 201, degree candidacy or permission of instructor.
- 219 **Information Security and Policy** (3)  
Computer fraud and countermeasures for computer system security. Data privacy, ethics in database management, information access policy, data security, contracts. Transborder data flow, technology transfer, electronic funds transfer systems, computer infringement of copyright, and protection of property rights in software. Prerequisite: AdSc 202, 203.
- 220 **Organizational Decision Making** (3)  
Examination of processes in organizational decision making; the state of theory; research and applications for the practicing manager. Topics include managerial style and decision making, problem discovery and diagnosis, search for the design of solution, evaluation and choice, group decision making, decision aids and support systems, and risk analysis. Prerequisite: AdSc 211.
- 221 **Introduction to Computers, Programming, and Information Systems** (3)  
Computer architecture, hardware, and software and in management information systems. Information systems principles, including data processing applications, data communications, database management, and operating systems. Program structures, structured modularization, structured programming concepts; stepwise refinement and top-down programming.
- 222 **Theory and Practice of Compensation Management** (3)  
Analysis of contemporary compensation systems from both theoretical and practical perspectives, including the latest decisions of courts and regulatory agencies. Examination of motivational theories of pay, determinants and effects of salary structures on performance, incentive plans, performance-based compensation, and managerial compensation systems. Prerequisite: AdSc 214.
- 223 **Collective Bargaining** (3)  
Analysis of federal and state employee relations laws and regulations. Topics include the bargaining environment, wage and benefit issues in arbitration, arbitration of grievances, and employee relations in non-union organizations. Behavioral theories of labor negotiations. Prerequisite: AdSc 222.

- 225 Management Information Systems Development (3)**  
The capstone course of the management information systems track. Individual and team working experience in the actual design, development, implementation, and evaluation of a computerized management information system. Emphasis on needs assessment, organizational structures, user manuals, and documentation. Prerequisite: AdSc 205, 206, 219.
- 240 Corporate Policy and Social Responsibility (3)**  
Examination of the process of policy analysis, development, and implementation. Analysis of policy mechanisms, including technology assessment, research and development, regulatory and control mechanisms. Illustrative examples of policy issues and problems drawn from government and industry, covering broad range of substantive areas.
- 295 Directed Research in Administrative Sciences (arr.)**  
Supervised research in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.
- 297 Special Topics in Administrative Sciences (3)**  
Special topics in management information systems technology; human resources; strategic planning; computer-based learning; human-computer interaction; organizational design. Prerequisite: AdSc 201 or 211 or Psyc 245.
- 298 Directed Readings in Administrative Sciences (arr.)**  
Supervised readings in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.

### AMERICAN STUDIES

Professors R.H. Walker, Jr., C.C. Mondale, B.M. Mergen (Director), H.F. Gillette, J.M. Vlach

Professorial Lecturers L. Miller, W.E. Washburn

Associate Professors J.O. Horton, R.W. Longstreth, P.M. Palmer

Adjunct Associate Professor P.J. Cressy

Associate Professorial Lecturers B.G. Carson, G. Kulik

### Graduate Committee

W.H. Becker, H.F. Gillette, Jr., J.O. Horton, H.L. LeBlanc, R.W. Longstreth, B.M. Mergen, C.C. Mondale, P.M. Palmer, L.P. Ribuffo, C.W. Sten, J.M. Vlach, D.D. Wallace, R.H. Walker

**Master of Arts in the field of American civilization—Prerequisite: the degree of Bachelor of Arts in American civilization or a related field.**

Required: the general requirements stated under the Graduate School of Arts and Sciences, including (1) AmCv 271-72; (2) 18 credit hours chosen in a carefully planned pattern of study of American civilization; (3) a comprehensive examination covering general competence in American civilization and the candidate's area of concentration; a thesis (6 credit hours) written on a topic approved by the student's advisor or permission of the advisor and the director of the program; 12 credit hours of additional course work, 6 of which must be research oriented. Special options in the master's degree program include the following

**1. A concentration in museums and material culture—Course emphasis on the use of artifacts in historical research, offered in association with the Smithsonian Institution.** Required in addition to the general requirements outlined above: AmCv 250. Recommended: courses in decorative arts, architectural history, historical archaeology, historical technology, and history of art. Programs specific to museum studies and museum education are also available.

**2. A concentration in historic preservation—Course emphasis on interpreting historic preservation through a humanistic framework.** Prerequisite: a course in American architectural history. For this concentration, the general requirements outlined above are amended as follows. Required: 36 credit hours, consisting of 12 hours of American civilization courses including AmCv 271-72, 18 hours of historic preservation courses including AmCv 277-78; a thesis (6 hours). A comprehensive examination, as outlined above, is required.

**3. A concentration in folklife—Course emphasis on the expressive culture of American folk societies and theories and methods for its evaluation and interpretation.** Required in addition to the general requirements outlined above: AmCv 254, 257. Recommended:



courses in topics related to folklife, such as regionalism, oral history, material culture, vernacular architecture, and social and cultural history

**Doctor of Philosophy in the field of American civilization**—This program combines work in the humanities and/or social sciences as preparation for research and teaching, with the option of stressing preparation for museum and library careers. Applicants are required to have an adequate background in the humanities and/or social sciences as they apply to the understanding of American civilization.

Required: the general requirements stated under the Graduate School of Arts and Sciences and successful completion of a reading knowledge examination in an approved foreign language. Candidates must pass a General Examination in four areas within three calendar years of matriculation. American cultural history is the only required field. Three other fields are elected with approval of the advisory committee; one field must represent foreign coverage. Other areas may be chosen from the following groups: (1) American diplomatic, economic, political, social, or urban history; folklife, literature, art, philosophy, or religion; Afro-American history; historic preservation; or some areas of the social and behavioral sciences. (2) in association with staff at the Library of Congress—supervised historical study in bibliographic resources, including American history and politics, cartography, cross-cultural studies, government documents, graphic arts, music, motion pictures and recorded sound, printing and bookmaking; (3) in affiliation with the Smithsonian Institution—supervised studies including aerospace history, decorative arts, ethnology, history of science, history of technology, industrial archaeology, material aspects of American civilization, and various fields in the history of art. Additional areas of study may be arranged within the University and in both the Library of Congress and the Smithsonian. Special announcements concerning these programs are issued periodically and are available in the office of the Director of the American Studies Program.

Research fields for the dissertation may be chosen from any of the above except those dealing with the culture of an area outside the United States.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**225 History of Washington, D.C. (3)**

The social history of Washington, from village to metropolis, with emphasis through field trips on the evolution of residential neighborhoods and related issues of historic preservation and conservation. Same as Hist 225. (Spring)

Gillette

**254 Folklore Theory (3)**

An intellectual history of American folklore research; analysis of particular theories and methods. Same as Anth 254. (Spring)

Vlach

**255-56 Research Orientation Seminar: Americana Collections (3-3)**

Examination of major themes in American civilization as they relate to the collections in major Washington-area libraries. Full-year course with direct exposure to Library staff and materials. May be taken either as a conventional seminar culminating in a research paper or as preparation for a doctoral reading field. (Alternate academic years)

Staff

**257 Seminar: American Folklife (3)**

Research and discussion on the traditional cultures of various geographical regions of the United States. Analysis of folk art, craft, and architecture, regional and ethnic identities. Same as Anth 257. (Fall)

Vlach

**259 Topics in American Folklife (3)**

A seminar devoted to a variety of subjects related to folklore and folklife, such as public-sector folklife policy, folk music, oral literature, or ethnic folklore and culture. The specific topic will be determined by the interests of available faculty. May be repeated for credit. Same as Anth 259.

Staff

**260 Women and Work in the United States (3)**

Same as WStu 260 and Econ 141.

Haber, Palmer

**271-72 Seminar: Scope and Methods in American Studies (3-3)**

Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American civilization. (Academic year)

Mondale

**275 The Politics of Historic Preservation (3)**

Same as UPRE 275.

Staff

- 276 Economics of Preservation (3)**  
Same as UPRE 276.
- 277-78 Historic Preservation: Principles and Methods (3-3)**  
The scope and purpose of the preservation movement in the United States, with focus on developments since the 1960s. Preservation theories, attitudes toward the past and toward design, the intent and impact of legislation, approaches to documentation, the concept of significance, and preservation as an instrument of change. Same as Hist UPRE 277-78. (Academic year)
- 282 Seminar in American Architecture (3)**  
Advanced research problems addressing artistic, cultural, social, technical, and urbanistic aspects of American architecture in the 19th and 20th centuries. Topics vary. Prerequisite: AmCv 175 or 176 or equivalent, or permission of instructor. (Spring, alternate years)
- 286 Interpretation in the Historic House Museum (3)**  
Same as Educ 286.
- 289-90 Seminar: Topics in American Civilization (3-3)**  
Research problems selected by the instructor. Preparation in American culture, history or other area appropriate to the topic of the seminar. (Academic year)
- 294 Field and Laboratory Research in Archaeology (3)**  
Same as Anth 294.
- 295 Independent Study (arr.)**  
Limited to master's candidates. Written permission of instructor required.
- 299-300 Thesis Research (3-3)**
- 351 Vernacular Architecture (3)**  
Examination of selected regional and ethnic traditions in American building. Survey and field techniques, comparative study of related types of objects and use of documentary sources. (Spring)
- 355-56 Practicum: Advanced Library Research (3-3)**  
Practical problems in control of library materials with emphasis on collections in major area libraries. Prerequisite: AmCv 255-56. (Academic year)
- 379-80 Readings in American Cultural History (3-3)**  
For students preparing for the Doctor of Philosophy general examination in the field of American cultural history. (Academic year)
- 398 Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

#### Courses Offered in Affiliation with the Smithsonian Institution

The Graduate School of Arts and Sciences is affiliated with the Smithsonian Institution Program for Graduate Students in the History of American Civilization. The following courses are offered at the National Museum of American History and at the National Portrait Gallery by members of their staffs.

- 250 Orientation Course: Material Aspects of American Civilization (3)**  
Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the master's and doctoral programs affiliated with the Smithsonian Institution. (Fall)
- 251 Museum Research and Education (3)**  
Supervised work and/or study under the direction of Smithsonian staff members and research associates—museum visitor behavior, costumes and furnishings, decorative arts, and photography as historical documentation. (Fall, alternate spring)
- 252-53 American Decorative Arts (3-3)**  
Concepts of visual recognition and evaluation of surviving domestic artifacts from the 17th, 18th, and 19th centuries, including those made of wood, glass, metal, and cloth. AmCv 252 is prerequisite to AmCv 253. (Academic year)



- 284 Seminar: Studies in American Art and History (3)** Staff  
Joint offering of the American Studies Program and the Art Department. Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. May be repeated for credit.
- 285 Technology, Labor, and American Society (3)** Kulik  
Selected readings on the interrelations among technology, labor, and society in the United States.
- 352 Research in Selected Aspects of American Civilization (3)**  
Supervised study and or fieldwork in selected subject areas related to the activities of the Smithsonian Institution. (Fall or spring)
- 394 Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit.
- 395 Dissertation Research (arr.)**  
For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. May be repeated for credit.

## ANATOMY

Professors M.J. Koering, K.E. Johnson, J.M. Rosenstein, K.D. Peusner  
Associate Professors F.J. Slaby, R.J. Walsh (*Interim Chair*), R.C. Bohn

**Doctor of Philosophy in the field of anatomy**—Required The general requirements stated under the Graduate School of Arts and Sciences. Candidates must demonstrate proficiency in biostatistics and computer science. There will be a comprehensive written and oral examination that will cover at least three areas of anatomical studies. Research fields: cell ultrastructure, embryology, gross anatomy, histology, neuroanatomy, and physical anthropology.

Faculty approval is required for all courses.

- 202 Gross Anatomy (6)** Slaby and Staff  
Regional dissections of adult cadaver supplemented with lectures and x-rays. Laboratory fee, \$30. (Fall)
- 203 Human Developmental Anatomy (1)** Johnson  
Origin and development of human body; emphasis on study of human development in interpreting anatomical anomalies. (Fall)
- 204 Neuroanatomy (2)** Peusner  
Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, \$13
- 205 Human Microscopic Anatomy (3)** Koering and Staff  
Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, \$20 (Fall)
- 212 Neurobiology (3)** Staff  
An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstration, and laboratory. Same as Phyl 212. Laboratory fee, \$25.
- 221-22 Seminar (1-1)** Walsh  
Research reports and discussions of special topics by guest lecturers, staff, and students. (Academic year)
- 249 Introduction to Anatomical Research (1)** Staff  
Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall)
- 252 Physical Anthropology (1)** Staff  
Variations in humans and factors affecting them; human evolution and racial differences; anatomy and culture of ancient humans. (Spring)
- 253 Brain-Tissue Interactions (1)** Walsh, Rosenstein  
Interactions of the central nervous system with the muscular, sensory, and endocrine systems. Student presentations and clinical aspects. Prerequisite: Anat/Phyl 212. (Spring)

- 254 Fetal Anatomy (2)**  
Dissection of midgestational fetus. Comparison of fetal and adult structures.  
Limited enrollment. Laboratory fee, \$10. (Spring) Staff
- 256 Teratology (1)**  
Introduction to teratologic principles and techniques, with emphasis on experimental design. Limited enrollment. John
- 260 Electron Microscopy in Cellular Biology—Lecture (1)**  
Introduction to the morphology of the cell and its relationship to electron microscopic techniques. (Spring) Koering
- 261 Electron Microscopy (4)**  
Introduction to the routine processing of specimens; preparation and interpretation of micrographs. Limited enrollment. Admission by permission of instructor. Koering  
Prerequisite or concurrent registration: Anat 260. Laboratory fee, \$25 (Spring) Staff
- 262 Gross Anatomy of Upper and Lower Extremities (2)**  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring) Staff
- 264 Gross Anatomy of Head and Neck (2)**  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring) Staff
- 266 Gross Anatomy of Thorax and Abdomen (2)**  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring) Staff
- 268 Gross Anatomy of Pelvis, Perineum, and Lower Extremity (2)**  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring) Staff
- 276 Advanced Studies in Anatomy (1)**  
Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, and others. May be repeated for credit. (Spring) Staff
- 277 Special Topics in Neuroanatomy (3)**  
Selected topics regarding the structural and functional organization of the nervous system. May be repeated for credit. (Spring—alternate years) Bohn, Peusner, Rosenstein, Walz Staff
- 288 Surface Anatomy and Radiology (1)**  
Lectures on areas of clinical importance. (Spring) Staff
- 289 Biochemical and Morphological Techniques in Cell Biology (3)**  
The application of biochemical and electron micrographic techniques used in cell biology research. Limited enrollment. Staff
- 295 Research (arr.)**  
Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring) Staff
- 398 Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Staff
- 399 Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit

## ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, Jr., A.S. Brooks, C.J. Allen

Professorial Lecturer D.H. Ubelaker

Associate Professor S.L. Simons (Chair)

Adjunct Associate Professors C.R. Rose, P.J. Cressey

Associate Professorial Lecturers S. Hertz, C. Cheney

Assistant Professors J.C. Kuipers, R.N. Rasnake (Visiting)

Assistant Professorial Lecturers R.K. Evans, B. Hackett, T. Kavanagh, N.I. Bence, H.D. Sues

Master of Arts in the field of anthropology—Prerequisite: a bachelor's degree; a major in anthropology is preferred but not mandatory. The undergraduate program should include courses above the introductory level in anthropological theory, social organization, linguistics, archaeology, and biological anthropology. Students with less background



in anthropology may be admitted but may be required to take one or more undergraduate courses to make up deficiencies before beginning the degree program.

1. **General degree**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved graduate course work, generally followed by a thesis (equivalent to 6 credit hours). Under certain circumstances, however, the department may permit a program of study consisting of 36 credit hours of approved course work without a thesis. At least 6 credit hours drawn from the sequence Anth 201, 202, 203, 204 should be included in the program of study and should be completed during the first 24 credit hours of graduate course work. For students with fewer than four undergraduate semesters of one major foreign language, a reading knowledge examination in a major foreign language must be passed before beginning the third semester of graduate work. All students must pass a general Master's Comprehensive Examination.

2. **With a concentration in museum training**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, above, with the following exceptions: the minimum requirement consists of 36 credit hours of approved graduate course work and must include from 12 to 15 credit hours of work in museum-related courses, 6 credit hours of which may be in an internship. Museum training students may substitute for the foreign language reading examination an appropriate course in chemistry or photography, if approved by the department. No thesis is required, but students are expected to submit to the department at least one research paper of publishable quality on a museum-related topic. Students whose primary interest is in museum techniques, rather than anthropology, are advised to apply to the master's program in museum studies (see Museum Studies). A program in museum education is also available.

3. **With a concentration in development**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, with the following exceptions: this is a 36-credit-hour nonthesis program, including 6–9 hours in development anthropology (Anth 220, 221, 222, 223), 18–21 hours in other anthropology courses, and 6–9 hours in economics and economic development. In some circumstances a thesis may be allowed. The program is designed to improve the student's understanding of complex development problems, such as economic change, population, health, education, migration, and ecology, within an anthropological framework. A limited number of internships will be available at public and private development agencies in the Washington area.

4. **With a concentration in folklife**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, with the following exceptions: this is a 30-credit-hour thesis program consisting of 24 hours of anthropology, including 6 hours of folklore core courses (Anth/AmCv 254 and 257). In some circumstances a 36-credit-hour nonthesis program may be allowed.

**Master of Science and Doctor of Philosophy in the field of geobiology**—see Geobiology. With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs section for course listings.

201 **Proseminar: Biological Anthropology** (3) Brooks  
Theories, methods, and current issues in the various subdisciplines of biological anthropology. (Spring)

202 **Proseminar: Sociocultural Anthropology** (3) Krulfeld, Allen  
Major topics in contemporary social and cultural anthropology, stressing current journal and monograph materials. (Spring)

203 **Proseminar: Linguistic Anthropology** (3) Kuipers  
Contemporary anthropological studies of language in biological, social, and historical perspectives. (Fall)

204 **Proseminar: Method and Theory in Archaeology** (3) Humphrey, Brooks, Benco  
Survey of the most recent archaeological techniques and theoretical approaches to reconstructing and interpreting the cultures of the past. (Fall)

211 **Seminar: Problems in Conservation** (3) Rose  
Joint offering of the Anthropology and Art Departments. Individual conservation projects to determine composition, construction, decomposition of materials.

- and possible stabilization techniques. Conservation laboratory experience. Prerequisite or concurrent registration: Art or Anth 212. (Fall)
- 212 Advanced Conservation Techniques (3)**  
Joint offering of the Anthropology and Art Departments. Physical structure, molecular biology, and chemistry of ethnographic materials. Chemistry and physics underlying techniques used to conserve these materials. Prerequisite: Art or Anth 293, Chem 50, and permission of instructor. (Fall)
- 220 The Anthropology of Development (3)**  
The role of anthropology in development; theoretical perspectives that distinguish the contribution of anthropology to understanding processes of change in the Third World. Land reform, ecological impact, agricultural and pastoral systems, women's roles, migration, politics and proletarianization. The role of anthropology in planning and implementing projects and policy. (Fall)
- 221 Key Variables in the Development Process (3)**  
Major factors required for anthropologists' development work in the areas of population, education, agriculture, irrigation, forestry, nutrition, health care, migration and resettlement, marketing, and communications. Isolation and study of the major variables and processes in each area to aid in successful planning, feasibility study, implementation and evaluation. (Spring)
- 222 Issues in Development (3)**  
Topic to be announced in the Schedule of Classes.
- 223 New Research Methods and Techniques in Development Anthropology (3)**  
Research methods in international development anthropology. Anthropologists' roles in multidisciplinary teams, including research-related activities, such as feasibility studies, social soundness analysis, and evaluations. Innovative research techniques, such as interactive data gathering, team survey methods, and rapid rural appraisal. Admission by permission of instructor. (Spring)
- 224 Internship in Development Anthropology (3)**  
Supervised participation in a selected development agency. Opportunity to observe agency procedures and gain practical experience of agency activities. Admission by permission of instructor or department chair. May be repeated for credit. (Fall and spring)
- 247 Palaeoanthropology (3)**  
Survey of current research in hominid and hominoid evolution, focusing on the integrated nature of the field. Contributions from the geological and biological sciences will be stressed, together with innovative geochemical techniques for establishing chronological sequences. Prerequisite: Anth 147 or BiSc 150 or equivalent. (Spring, even years)
- 254 Folklore Theory (3)**  
Same as AmCv 254.
- 255 Anthropology, Education, and the Museum (3)**  
The role of anthropology in education and museums. Emphasis on current anthropological research and on innovative museum and classroom techniques and materials. Seminars and teaching demonstrations at museums and laboratories.
- 257 Seminar: American Folklife (3)**  
Same as AmCv 257.
- 258 Seminar: Anthropology of Art, Aesthetics, and Symbolism (3)**  
Anthropological approaches to aesthetic problems and theories of symbolism in the context of ethnographic materials.
- 259 Topics in American Folklife (3)**  
A seminar devoted to a variety of subjects related to folklore and folklife, such as public-sector folklife policy, folk music, oral literature, or ethnic folklife and culture. The specific topic will be determined by the interests of available students and the curriculum needs of the folklife program. Same as AmCv 259.
- 260 Special Topics in Contemporary Anthropology (3)**  
Exploration of a timely theoretical issue, enabling students to keep abreast of significant developments in the field. Specific topic to be announced in the Schedule of Classes. May be repeated for credit.



- 262 **Seminar: Applied Anthropology** (3) Cheney  
Use of anthropological methods and techniques in such specific fields as government, community development, land reform, law, and medicine. (Fall)
- 263 **Seminar: Culture Contact and Change** (3) Simons  
Change in Western and non-Western cultures: emphasis on general processes of change and interaction between simpler and more complex societies. (Fall)
- 264 **Seminar: Anthropological Museum Techniques** (3) Humphrey  
Principles of anthropological collection, classification, preservation, identification, interpretation, and exhibition of specimens, research and instructional use of the museum. Field trips to area museums. (Fall)
- 266 **Seminar: Technology** (3) Humphrey, Benco  
Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. (Spring, odd years)
- 267 **Seminar: Economic Anthropology** (3) Krulfeld  
Comparative study of systems of production, distribution, consumption, political economy and economic change in both preliterate and complex societies.
- 268 **Seminar: Peasant Society** (3) Krulfeld  
Cross-cultural analysis of peasant societies, including their manner of functioning within larger social, economic, and cultural contexts. (Fall)
- 269 **Seminar: Key Issues in Social Organization** (3) Simons  
Current issues in the analysis and interpretation of kinship and political and legal phenomena, with particular emphasis on problems of social and ideological change in developing countries and their effect on sex roles, the family, and social networks. (Spring)
- 272 **Seminar: Topics in Latin American Anthropology** (3) Allen, Rasnake  
Specific topics, to be announced, will be selected from the following: mythology and ritual, artistic traditions, ethnic groups, Andean or Tropical Forest social organization, peasant movements and land reform, native cultures during the Colonial period, archaeological problems.
- 273 **Seminar: Urban Anthropology** (3) Hertz  
A review of the literature on urban kin groups, occupational class and ethnic communities, migrant adaptations; the nature of urbanism, urban poverty, urban field methods. (Spring)
- 274 **Seminar: Topics in American Culture** (3) Hertz  
Review of anthropological literature on American world view, mainstream and alternate forms of kinship, selected ethnic groups, and the effects of sex, age, class, occupation, and politics on American life. (Fall)
- 282 **Seminar: Advanced Archaeology—New World Prehistory** (3) Humphrey  
Current archaeological problems relating to the origin and development of aboriginal cultures. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit.
- 283 **Seminar: Topics in Old World Anthropology—Physical Anthropology and Archaeology** (3) Brooks  
Current problems in relation to materials from the old world. Specific area to be announced in the *Schedule of Classes*. (Spring)
- 290 **Advanced Museum Research** (3) Staff  
Supervised individual research and/or field work at the Smithsonian Institution or other area museums, arranged in consultation with the museum and the Anthropology Department. Admission by permission of the department chairman. May be repeated for credit. (Fall and spring)
- 291 **Anthropology in the Museum** (3) Humphrey, Evans  
Anthropological materials (in the broadest sense), exhibits, and museums. Topics include museum anthropology, collections, research, interpretation, and education, with a focus on the practical problems of developing an anthropological exhibit hall. (Spring)
- 292 **Introduction to Conservation** (3) Rose  
Same as Art 292.
- 293 **Preventive Conservation Techniques** (3) Rose  
Same as Art 293.
- 294 **Field and Laboratory Research in Archaeology** (3) Cressey, Brooks  
Same as AmCv 294. Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording, photography, conservation,

stratigraphy, environmental reconstruction, typology, use-wear analysis, spatial analysis, faunal analysis, provenance studies, and dating. Specific research areas and topics to be announced. May be repeated for credit. (Summer) Staff

295 **Research** (arr.)

May be repeated for credit.

298 **Dumbarton Oaks Courses** (arr.)

Courses offered each year by scholars in residence at Dumbarton Oaks are open to qualified graduate and undergraduate students with permission of department chairman. Topics will be announced. May be repeated for credit provided the topic differs. Staff

299-300 **Thesis Research** (3-3)

**APPLIED SCIENCE**

Interdepartmental course offerings in the School of Engineering and Applied Science.

211 **Analytical Methods in Engineering I** (3)

Engineering applications of the theory of complex variables: contour integration, conformal mapping, inversion integral, and boundary-value problems. Prerequisite: approval of department. (Fall and spring) Staff

212 **Analytical Methods in Engineering II** (3)

Algebraic methods appropriate to the solution of engineering computational problems: linear vector spaces, matrices, systems of linear equations, eigenvalues and eigenvectors, quadratic forms. Prerequisite: approval of department. (Fall) Eftis and Staff

213 **Analytical Methods in Engineering III** (3)

Analytical techniques for solution of boundary-initial-value problems in engineering: wave propagation, diffusion processes, and potential distributions. Prerequisite: approval of department. (Fall and spring) Eftis and Staff

214 **Analytical Methods in Engineering IV** (3)

Introduction to variational methods in engineering: Ritz and Galerkin approximation methods of boundary-value problems, aspects of linear integral equations arising from engineering analysis. Prerequisite: approval of department. (Spring, odd years) Eftis and Staff

215 **Analytical Methods in Engineering V** (3)

Advanced methods of solution of boundary-initial-value problems in engineering: characteristics, wave propagation, and Green's functions. Prerequisite: ApSc 213. (Fall, odd years) Eftis and Staff

216 **Special Topics in Engineering Analysis** (3)

Selected topics, such as perturbation techniques applied to approximate solutions of nonlinear boundary and initial-value problems in engineering, application of singular integral equations in problems of mechanics. Prerequisite: approval of department. (Spring, even years)

**ART**

Professors D.H. Teller, L.F. Robinson, J.F. Wright, Jr., A.H. Smith, J.L. Lake, T. Oudga, M.P. Lader (Chair), C.C. Costigan

Professorial Lecturers Grace Evans, L. Miller

Associate Professors H.I. Gates, D.M. Hitchcock, J.C. Anderson, B. von Baryhahn, S.B. Molina, W.T. Woodward, J.L. Stephanic, K.J. Hartwick

Adjunct Associate Professors Grose Evans, C.R. Rose

Associate Professorial Lecturers D. Srinivasan, J.G. Kauffman, A.B. Barnhart, B.G. Carson

Assistant Professors F. Griffith, D. Bjelajac, J.F. Harrop (Visiting)

Curator, Dimock Gallery L.D. Miller

Master of Arts in the field of art history—Prerequisite: a Bachelor of Arts degree with a major in art history from this University, or an equivalent degree.

1. With a concentration in classical art and archaeology, medieval art, Renaissance art, Baroque art, eighteenth- and nineteenth-century art, contemporary art, or American art. Required: the general requirements stated under the Graduate School of Arts and Sciences. 30 credit hours of course work including 6 hours of thesis research. As many as possible of the 30 credit hours of course work should be in third-group courses, not more than 6 hours



may be taken in museum-related courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and American. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. A written and oral general Master's Comprehensive Examination must be passed before students can enroll for the 6 credit hours of thesis research. A written thesis must be submitted to and approved by the faculty.

2. With a concentration in museum training—Required: the general requirements stated under the Graduate School of Arts and Sciences, 36 credit hours of course work, including 12 hours of internship credit (Art 201 - 2 and 271 - 72). As many as possible of the 36 hours of course work should be in third-group courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and American. Six hours of electives in art history or in museum-related courses are selected in consultation with the graduate advisor. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. Students are required to pass the general written Master's Comprehensive Examination in art history and may also be required to pass a written comprehensive examination in museology as part of the requirements for the internship.

Acceptance into this program as a degree candidate is provisional, pending satisfactory completion of 12 credit hours of graduate art history courses and the approval of the Graduate Programs Committee (Department of Art).

The Art Department has established a program of study in affiliation with a number of museums and galleries including the Corcoran Gallery of Art, the Hirshhorn Museum and Sculpture Garden, the Museum of African Art, the National Museum of American Art, the Phillips Collection, the Renwick Gallery, and the Textile Museum.

Programs specific to museum studies and museum education are also available.

**Master of Fine Arts in the field of ceramics, design, printmaking, painting, photography, sculpture, or visual communication.** Prerequisite: a Bachelor of Fine Arts or a Bachelor of Arts degree with a major in fine arts in the field of ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication. A 3.0 undergraduate grade-point average (on a 4.0 scale) and departmental approval of the applicant's work is required. This should consist of slide examples of work in the area of application as well as copies of representative works in other areas. Applicants to the photography program should submit photographic works only. Students planning to do graduate work in printmaking or painting must have completed 12 credit hours of drawing at the undergraduate level before admittance to the master's program.

Required: the general requirements stated under the Graduate School of Arts and Sciences. A minimum of 45 credit hours of course work in fine arts is required, the number of required hours is determined in consultation with an advisor. As much as possible of the course work should be in third-group courses, only 18 hours of which may be in one area; 6-9 hours are to be selected from related areas in consultation with the advisor. A creative thesis consisting of the execution of original works of art in ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication will be completed under the supervision of a thesis advisor. In addition, the thesis must include a written statement and analysis of artistic purpose, subject to the approval of the thesis advisor and a second faculty reader. A representative portion of the work illustrating the creative thesis may be retained by the University at the discretion of the thesis director in agreement with the second reader.

**Doctor of Philosophy in the field of art history.** Required: the general requirements stated under the Graduate School of Arts and Sciences, and a Master of Arts degree in art history. Candidates must also pass written examinations in French and German and Language examinations in one major area of specialization and two other areas of specialization. Examinations should be completed within the first academic year of course work. Programs are planned in consultation with a departmental committee.

Research fields: Nineteenth- and twentieth-century European art and American art, supporting fields: Classical art and archaeology, early Christian and Byzantine art, Renaissance art, and Baroque art.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs bulletin for course listings.

## ART HISTORY

## 201-2 Museum Projects (3-3)

Open only to candidates for the degree of Master of Arts in the field of art history with a concentration in museum training.

203 Primitive Art (3)  
(Spring)

von Barghaun

207 Modern Architecture (3)  
Europe and America.

Leder

## 211 Seminar: Problems in Conservation (3)

Rose

Joint offering of the Art and Anthropology Departments. Individual conservation projects to determine composition, construction, decomposition of materials and possible stabilization techniques. Conservation laboratory experience. Prerequisite or concurrent registration. Art or Anth 212. (Fall)

## 212 Advanced Conservation Techniques (3)

Von Ende

Joint offering of the Art and Anthropology Departments. Physical structure, molecular biology, and chemistry of ethnographic materials. Chemistry and physics underlying the techniques used to conserve these materials. Prerequisite: Art or Anth 293, Chem 50, and permission of the instructor. (Fall)

Grace Evans

## 216 Medieval Painting (3)

Painting and the decorative arts.

Hitchcock

## 220 Seminar: Baroque Art of the 17th Century (3)

A reading knowledge of Italian is desirable for the Italian area and German for the northern area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

## 221 Seminar: Renaissance Art (3)

Star

A reading knowledge of French, German, or Italian is desirable, depending on the specific area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Bielajac

## 243 Seminar: American Art (3)

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Robinson

## 244 Seminar: 19th-Century European Art (3)

Reading knowledge of French desirable. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Leder

## 245 Seminar: 20th-Century European Art (3)

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Hartswell

## 246 Seminar: Classical Art (3)

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Andersson

## 247 Proseminar: Medieval Art and Archaeology (3)

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Star

## 248 Independent Research in Art History (3)

## 261 Seminar: Problems in Art History (3)

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

Star

## 271-72 Museum Techniques (3-3)

Open only to candidates for the degree of Master of Arts in the fields of museum training and museum studies. Practical work to be determined by Museum Training Committees at the institutions involved. (Academic year)

Star

## 284 Seminar: Studies in American Art and History (3)

Joint offering of the Art Department and the American Studies Program affiliation with the National Portrait Gallery of the Smithsonian Institution. Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

Star

## 289-90 Thesis Research (3-3)

(Fall and spring)

## 292 Introduction to Conservation (3)

Same as Anth 292. Method and theory of conservation, including fine arts, ethnographic, archaeological, and monuments conservation, handling, restoration.

Rose



tion, preservation, storage, and display of museum specimens; materials and environmental reactions of ethnographic objects. (Fall, spring, and summer)

293 **Preventive Conservation Techniques** (3) *Rose*

Same as Anth 293. Preventive conservation monitoring environmental conditions, examining objects and documenting their state, and identifying sources of deterioration. Students conduct tests, evaluate exhibition and storage areas, and help to improve museum conditions. Prerequisite: Anth Art 292

385-86 **Readings in Art History** (3-3)

Enrollment limited to doctoral candidates

398 **Advanced Reading and Research** (arr.)

For students preparing for the doctoral examination.

399 **Dissertation Research** (arr.)

## FINE ARTS

**Note:** All fine arts courses may be repeated for credit with approval of the department.

**Schedule of fees for Art 248 and 299-300:** Ceramics—\$57, 2-D Design—\$24, 3-D Design—\$27, Drawing—\$75, Printmaking—\$36, Sculpture—\$27, Typography—\$54, Oil and Acrylic Painting—none, Watercolor—\$45, Photography—\$75, Visual Communication—\$54, Lithography—\$48, Serigraphy—\$54, Jewelry Design—\$36

205 **Advanced Photography: Zone System Tests** (3) *Lake*

Tone control through exposure development tests. Completion of laboratory manual required. Prerequisite: Art 181 and 182 or permission of instructor. Laboratory fee, \$75. (Fall and spring)

206 **Advanced Photography: Color Printing and Zone Proofs** (3) *Lake*

Printing from color negatives. Correct color balancing and creative color shifts will be explored. Development of portfolio of prints utilizing approved theme and the exposure and development times established in Art 205. Prerequisite: Art 181 or 205, as determined by instructor. Laboratory fee, \$75. (Fall and spring)

208 **Advanced Photography: Special Projects** (3) *Lake and Stephanic*

Independent projects requiring approval prior to registration. Prerequisite: Art 181 and 182, or permission of instructor. Laboratory fee, \$75. (Fall and spring)

209-10 **Exhibition and Display Design** (3-3) *Miller*

224 **Advanced Ceramic Sculpture** (3) *Ozdogan*

Continuation of Art 152 with emphasis on individual approach. Exploration of mixed media and mold casting. Laboratory fee, \$57. (Fall)

225 **Advanced Ceramic Decoration** (3) *Ozdogan, Smith*

Perfection of decorating techniques. Students establish style through independent exploration. Laboratory fee, \$57. (Spring)

226 **Architectural Ceramics** (3) *Ozdogan*

Advanced studies in ceramic murals and sculptures designed for indoor and outdoor architectural concepts. Laboratory tests and activities. Laboratory fee, \$57. (Spring)

231-32 **Design III** (3-3) *Gates*

New media and techniques in three-dimensional design. Laboratory fee, \$27 per semester. (Academic year)

234 **Design IV: Jewelry Design** (3) *Gates*

Theory and fabrication of jewelry using basic metal techniques, assemblage approach, and lost-wax casting. Laboratory fee, \$36. (Fall and spring)

235 **Design V: Textile Printing** (3) *Teller*

Designing and executing textiles using the techniques of silk screen, block print, and batik. Laboratory fee, \$24. (Fall and spring)

248 **Independent Research in Fine Arts** (3)

For master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate advisor. May be repeated for credit. Laboratory fee depending on area chosen. (Fall and spring)

249 **Theory of Design** (3) *Costigan*

Application of design principles to problems of the artist in all disciplines. Emphasis on individual creativity, presentation, and criticism. Guest lectures on issues in contemporary art. Open to all M.F.A. candidates and to seniors with permission of instructor. Laboratory fee, \$9

- 251 **Advanced Ceramic Design in Wheel Throwing** (3) Ozdoğan  
Individual projects on the potter's wheel. Student establishes personal style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays, glazes, and firings is required. Laboratory fee, \$57. (Fall and spring)
- 252 **Advanced Ceramic Design in Hand Building** (3) Ozdoğan  
Individual projects in hand building. Student establishes style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays and glazes is required. Laboratory fee, \$57. (Fall and spring)
- 253 **Industrial Ceramic Design/Mold Making** (3) Ozdoğan  
Study in the multiple production process from model making to finished duplicate form as it exists on factory level. Methods include all aspects of model designing and making in clay and plaster; mold making in plaster; production methods from molds including press molding, slip casting, jiggering, and jolly-ing. Laboratory fee, \$57. (Fall and spring)
- 254 **Ceramic Glazes: Calculation and Formulation** (3) Sarı  
Laboratory fee, \$21.
- 255-56 **Printmaking: Advanced Serigraphy** (3-3) Teller  
Utilization of principles and techniques of serigraphy toward development of personal statement and style. Prerequisite: Art 143-44. Laboratory fee, \$54 per semester. (Academic year)
- 257-58 **Printmaking: Etching and Engraving** (3-3) Griffin  
Advanced problems in etching and engraving, including composite processes, light-sensitive grounds, mixed media, and theoretical and practical problems in color prints. Laboratory fee, \$36. (Fall and spring)
- 259 **Printmaking: Advanced Lithography** (3) Barnhart  
Individual problems in lithography related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Emphasis on mastering the lithographic process and developing a personal statement and style. Laboratory fee, \$48.
- 260 **Printmaking: Relief Printing** (3) Griffin  
Advanced problems, practical and theoretical, in woodcut, wood engraving, collograph, composite techniques, and mixed media in monochrome and color. Laboratory fee, \$36. (Fall and spring)
- 265-66 **Painting IV** (3-3) Woodward  
Alternatives in pictorial dynamics. Assigned studio and independent problems in alla prima and mixed techniques. Material and model fee, \$39 per semester. (Academic year)
- 267-68 **Individual Problems in Photography** (3-3) Stephan  
Limited to M.F.A. candidates and qualified undergraduates. Prerequisite: permission of instructor and approval of project prior to registration. May be repeated for credit. Laboratory fee, \$75 per semester. (Academic year)
- 275 **Painting V** (3) Woodward  
Development of personal imagery, individual problems and critiques. Material and model fee, \$39.
- 277 **Advanced Visual Communication: Packaging Design and Illustration** (3) Melles  
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, \$36. (Fall and spring)
- 278 **Advanced Visual Communication: Problem Solving and Applied Design** (3) Melles  
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, \$36. (Fall and spring)
- 279-80 **Sculpture IV** (3-3) Galt  
Advanced study aimed at development of concept and style. Prerequisite: permission of instructor. Laboratory fee, \$27. (Academic year)
- 281 **Sculpture V** (3) Galt  
Emphasis on individual sculptural concepts and materials. Prerequisite: permission of instructor. Laboratory fee, \$27. (Fall and spring)
- 299-300 **Thesis Research** (3-3) Star  
Laboratory fee depending on area chosen.



Adjunct Professor E. Ulman (Emeritus)  
 Adjunct Associate Professor E. Kramer  
 Assistant Professor K.J. Williams (Program Director)  
 Adjunct Assistant Professors W. Maiorana, A.J. Di Maria, A. Corson, C.T. Cox  
 Clinical Instructors B.K. Mandel, N.J. Miller, M.M. Balbe ter Matt, K.A. Bladergroen,  
 F. Creo, A. Elkinson-Griff, A.L. Keeble, E.A. Mills, P. Prugh, L. St. Germaine  
 Lecturers B. Barthell, G. Fenster

**Master of Arts in the field of art therapy**—Prerequisite: a bachelor's degree, evidence of significant training and/or experience in art, including painting, drawing, and clay modeling, course work in the behavioral and/or social sciences, including personality theory, abnormal psychology, and child psychology

Required the general requirements stated under the Graduate School of Arts and Sciences and successful completion of 36 credit hours of graduate course work. At least 24 credit hours must be in art therapy and must include ArTh 201, 203, 205-6 or 207 and 208, 224, 226, and 283-84.

Fields of emphasis: adult art therapy, family art therapy, child art therapy, and research.

**Bachelor of Arts-Master of Arts in the field of art therapy**—A five-year program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. The first three years of the program consist of undergraduate course work. (See the Undergraduate Programs Bulletin.) Application for admission to the M.A. program in art therapy will be made to the Graduate School of Arts and Sciences during the second semester of the third year; for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance to the M.A. program in art therapy is not desired or not obtained, the requirements for the B.A. degree in the undergraduate field chosen may be fulfilled by the successful completion of appropriate courses during the fourth year of study. If acceptance into the M.A. program in art therapy is obtained, the B.A. will be awarded after the successful completion of the fourth year of the program. Study during the summer following the award of the bachelor's degree and the following academic year would normally complete the M.A. degree requirements. The following requirements must be fulfilled:

1. Students must meet the general requirements stated under Columbian College of Arts and Sciences and the Graduate School of Arts and Sciences
2. The course requirements for the B.A. in either fine arts or psychology and for the M.A. in art therapy must be met.

### 201 Introduction to Art Therapy (3)

Lectures, presentation of illustrative case material, class discussion of assigned readings, field work. Survey covering range of art therapy practice, personality assessment and treatment approaches, historical development, main theoretical trends. Open only to art therapy degree candidates. (Fall)

Di Maria

### 202 Case Studies in Art Therapy (3)

Discussion of case material provided by students in order to refine methods of working and to improve written and oral reports. Instructor and other practitioners may provide supplementary illustrative material. Assigned reading. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring)

Di Maria

### 203 Technique of Art Therapy (3)

Art therapy approaches with individuals and groups of different diagnostic categories in various settings presented through illustrative clinical examples. Students experiment with numerous techniques through the use of art materials. Open only to art therapy degree candidates. (Fall)

Williams

### 204 Psychodynamic Processes in Art Therapy (3)

Concepts of instinctual drives; ego development; mechanisms of defense; sublimation; transference and countertransference; maturation and regression applied to work with children, adults, families, and groups. (Spring)

Kramer

### 205-8 Family Art Techniques (3-3)

Principles of work with families, with emphasis on the use of art techniques for evaluation of family dynamics. The major focus is on opportunities to conduct and observe family art evaluations. Enrollment is limited to 12. Prerequisite: ArTh 201, 203. Open to art therapy degree candidates only. (Fall and spring)

Fenster and Staff

- 207 Art as Therapy with Children (3)** Maiorana  
Introduction to the practical and theoretical considerations involved in art as therapy with children. Focus on psychodynamics, artistic developmental stages, methods of child art evaluation, and basic issues in therapeutic guidance of the child. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Fall)
- 208 Art Therapy with Adolescents (3)** Gerson  
Theoretical and practical issues in art therapy with adolescents in educational and clinical settings. Experiential work in art techniques appropriate to the population. Class discussion of readings on adolescent development. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring)
- 211 Survey of Art Therapy (3)** Barthe  
Use of visual arts to enhance personal development: history, theories, ranges of practice in art therapy. Illustrated lectures, reading, discussion, studio work. Not intended for art therapy degree candidates. Open to advanced undergraduate with permission of instructor. (Fall)
- 224 Process of Art Therapy (3)** Maiorana, Williams  
Exploration of the treatment process through discussion of literature from art therapy and related fields. Several critical papers will be required. Must be taken concurrently with ArTh 226. (Spring)
- 226 Process of Art Therapy (3)** Maiorana, Williams  
Exploration of the treatment process through rehearsal of fundamental ways of being a therapist and presentation of case material from field experience. Video and audiotaping required. Must be taken concurrently with ArTh 224 (Spring)
- 275 Group Art Therapy (3)** Williams  
Experience as participant, observer, and leader in an art-centered group; required reading, theory of group process. Open to art therapy master's degree candidates and others with permission of instructor. (Summer)
- 283-84 Practicum in Art Therapy (3-3)** Star  
Minimum of 300 hours field work per semester connected with service to clients. On-the-job supervision supplemented by group supervision from the art therapy staff. Prerequisite: ArTh 201 and 203. Open only to art therapy degree candidates. (Fall and spring)
- 285 Special Projects in Art Therapy (arr.)** Staff  
Individual work based on research. Empirical, clinical, and library research may be undertaken, as well as the development of new procedures. Details to be worked out with each student. May be repeated for credit with advisor's approval. Open only to degree candidates. (Fall and spring)
- 289 Special Topics in Art Therapy (1 to 3)** Star  
Connections between art therapy and other disciplines; new developments in the field. May be repeated for credit with approval of advisor. Open to art therapy degree candidates and others with permission of instructor. (Fall)
- 290 Workshops in Art Therapy (3)** Staff  
Art therapists and other mental health professionals will conduct four weekend workshops during the semester. Emphasis on the elucidation of concepts of treatment through lectures, discussion, and participation. (Fall)
- 298 Reading and Research (1 to 3)**

#### ASSOCIATION MANAGEMENT

See the School of Business and Public Management for the program of study leading to the degree of Master of Association Management.

- 270 The Association: Roles, Influence (3)** Emmett  
Introduction to the Association Management Program: development and nature of interest representation: its history; varieties of associations and their roles and functions, legal constraints, responsibilities, and ethics. (Fall and spring)
- 271 Marketing Management for Associations (3)** Star  
Market analysis, product planning, channels of distribution, pricing, and promotional decision making are presented, with particular application to associations. Topics include membership recruitment, fees, dues, and other monetary issues; physical location of the association; staff-membership contacts; promotion of association goals. (Fall)



- 272 Communications and Media Relationships for Associations (3)** Kasle  
Primarily for students in association management. The nature of the communication process, including both interpersonal and organizational communication. Problems and approaches; barriers to good communication. Methods of improving organizational communication. The media and their role; approaches to media relationships. (Spring)
- 273 Association Law and Lobbying (3)** Staff  
The role of the association in the political process, including the context within which interests are represented before Congress and the executive branch. Interest groups and their ideas and techniques. Rules and regulations governing lobbying activities and personnel matters. (Spring)
- 274 Marketing Strategy for Associations (3)** Divita  
Analysis of complex marketing problems of associations that involve policy and operational decisions. Creative marketing strategy. Prerequisite: AM 271. (Summer)
- 275 Information Systems for Associations (3)** Staff  
Introduction to the concepts of information systems as employed in associations. Data-base management systems, telecommunications systems, small business computers. (Fall)
- 276 Organization and Management of Associations (3)** Ernstthal  
Integrative approach to organizational and management concepts, theories, and practices, with particular attention to the problems of associations and similar types of organizations. Functions, roles, and responsibilities of the association manager. (Spring)
- 277 Financial Management for Associations (3)** Staff  
An overview of basic accounting principles and practices as they apply to associations, with attention to the economics of association management and financial planning, reporting, and auditing. Investments, revenues, bonds, debt, government funds. (Fall)
- 279 Current Issues in Association Management (3)** Ernstthal  
A review of elements of association management, with attention to the number and variety of associations and their responsibilities. Particular attention is given to the problems associations face now and will face in the future. A capstone seminar providing a review and synthesis of the Association Management Program. A significant research project is required. (Fall and spring)

## BIOCHEMISTRY

Professors J.M. Bailey, A.L. Goldstein (Chair), L.L. Gallo, A. Kumar, R.S. Schulof, G. Walker, T. Moody

Associate Professors J.Y. Vanderhoek, G. Fiskum, V. Hu, P.H. Naylor (Research)

**Master of Science in the field of biochemistry**—Prerequisite: a bachelor's degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11–12, Chem 11–12, 22, 151–52, 153–54; Phys 1, 2.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences, including Bloc 221–22, 223, 227, 234, 250, 266, 299–300, and the Comprehensive Examination. It is expected that students will complete all of the required work in approximately two years.

**Doctor of Philosophy in the field of biochemistry**—Required: the general requirements stated under the Graduate School of Arts and Sciences, including Bloc 221–22, 223, 227, 234, 250, 266, 399, and the General Examination.

**Research fields:** endocrinology—thyrosins, steroid hormones, prostaglandins; viral gene regulation, antiviral chemotherapy, immunology—immunochemistry, viral gene transactivation; lipids and membranes—essential fatty acids, membrane biochemistry, lipoproteins, complex lipids, cholesterol, peroxides, atherosclerosis, complement, toxins, HIV–1, neurochemistry—growth factors, bombesin, peptide receptors, bioenergetics—mitochondria,  $\text{Ca}^{++}$  transport, tumor cell metabolism, ischemia.

**221–22 General Biochemistry (4–4)** Fiskum, Hu, and Staff  
A comprehensive course in general biochemistry for graduate students in biological sciences and undergraduate students in biology and chemistry. Prerequisite: Chem 152, 154. (Academic year)

- 223 Physical Biochemistry (3)**  
Lectures cover basic laboratory techniques used in contemporary biochemical and molecular biological research. (Fall) Vanderhoof
- 227 Biochemistry Seminar (1)**  
Current literature in biochemistry. Limited to graduate students in the department. May be repeated for credit. (Fall and spring) Fiskum and Vanderhoof
- 230 Current Topics in Enzymology (2)**  
Directed readings in various areas of enzymology. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bio 234. Bailey and Staff
- 234 Structure and Function of Proteins and Enzymes (3)**  
Structure-function relationships of proteins, enzyme kinetics, regulation and reaction mechanisms, and other special topics. Prerequisite: Bioc 221 (Spring) Hu and Staff
- 235 Current Topics in Bioenergetics (1 or 2)**  
Directed readings in various areas of bioenergetics. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bio 222 Fiskum
- 240 Nutrition (2)**  
Content includes discussion of RDA, nitrogen balance, vitamins and minerals, diets, and other special topics. Prerequisite: Bioc 201 or 221-22. (Spring) Walker and Staff
- 250 Molecular Biology (3)**  
Content includes the organization and replication of genetic material, transcriptional and translational machinery, regulation of eukaryotic gene expression and other special topics. Prerequisite: Bioc 201 or 221-22. (Fall) Kumar and Staff
- 251 Current Topics in Molecular Biology (1 or 2)**  
Directed readings in the area of molecular biology. May be repeated for credit. Enrollment limited to graduate students in the department; others may enroll with approval of instructor. Prerequisite: Bioc 250. Kumar and Staff
- 252 Biochemical and Molecular Aspects of Selected Diseases (2)**  
Emphasis on the biochemical and molecular aspects of selected diseases. The format will be of a tutorial type, including presentations of material by students. (Spring) Kumar and Staff
- 261 Current Topics in Lipids (1 or 2)**  
Directed readings in the area of lipid biochemistry. May be repeated for credit. Enrollment limited to graduate students in the department. Gallo, Vanderhoof, and Staff
- 262 Lipoproteins (2)**  
Composition, synthesis, and metabolism of lipoproteins in normal and dyslipoproteinemic subjects. Prerequisite: Bioc 221-22. (Spring) Gallo
- 266 Cellular Biology (3)**  
Structure and function of cellular membranes, cytoskeleton, subcellular organelles, cellular bioenergetics, and intercellular interactions. Prerequisite: Bioc 221-22. (Spring) Fiskum, Vanderhoof, and Staff
- 270 Biochemistry and Cell Biology of the Immune Response (2)**  
Biochemical aspects of the immune response at the molecular and cellular level. Modern experimental approaches to immunology and cell biology. Prerequisite: Bioc 221-22 and Micr 229, or permission of instructor. (Spring) Naylor and Staff
- 271 Current Topics in Immunology (1 or 2)**  
Directed readings in the area of biochemical immunology. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 270. Goldstein and Staff
- 280 Neurochemistry (2)**  
Content includes molecular structure and function of nerve tissue; intra- and inter-neuronal communication mechanisms; biochemistry of various brain cell functions, and other special topics. Prerequisite: Bioc 201 or 221-22. (Fall) Moody and Staff
- 281 Current Topics in Neurochemistry (1 or 2)**  
Directed readings in neurochemistry. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 280. Moody and Staff
- 295 Research in Biochemistry (arr.)**  
Participation in a project under investigation in the department or one in a related field suggested by the student and approved by the staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring) Staff



## 299-300 Thesis Research (3-3)

## 398 Advanced Reading and Research (arr.)

Staff

Limited to students preparing for the Doctor of Philosophy general examination.  
May be repeated for credit.

## 399 Dissertation Research (arr.)

Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit.

## BIOLOGICAL SCIENCES

Professors S.O. Schiff, D.L. Atkins, R.K. Packer (Chair), R. Donaldson  
Professorial Lecturer D. Goldman

Associate Professors R.E. Knowlton, H. Merchant, T.L. Hufford, D.E. Johnson, J.R. Burns,  
K.M. Brown, D.L. Lipscomb

Assistant Professors E.F. Wells, H.B. Wagner, D.W. Morris, A. Alani (Research)

Master of Science in the field of biology, botany, or zoology—Prerequisite: a bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) Biology field—an undergraduate major in biology, botany, or zoology; (2) Botany field—an undergraduate major in botany or biology; (3) Zoology field—an undergraduate major in zoology or biology. The undergraduate program must have included the following courses, or equivalent: Chem 151-52 and 153-54, or 50. Math 31, Phys 1, 2, 5, 6, Stat 91 or 127. Required, the general requirements stated under the Graduate School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved course work plus a thesis (equivalent to 6 credits). With the permission of the department, a student may elect a program of study consisting of 36 credit hours of approved course work without a thesis.

Master of Arts in the field of museum studies, with specialization in the biological sciences, see Museum Studies.

Doctor of Philosophy in the field of biology, botany, or zoology—Required: the general requirements stated under the Graduate School of Arts and Sciences, plus satisfactory completion of a Preliminary Examination and the General Examination in at least three areas of biology. The program of study and fields of study are determined in consultation with an advisory committee appointed for each candidate.

Major Research Areas: ecology, evolution and systematics, plant biology, genetics, cell and molecular biology, developmental biology, vertebrate and invertebrate anatomy and physiology, marine and freshwater biology.

Master of Science and Doctor of Philosophy in the field of geobiology, see Geobiology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit, additional course work is required. See the Undergraduate Programs Bulletin for course listings.

## 204 Seminar: Invertebrate Zoology (3)

Knowlton

Review of selected topics in physiology, development, and ecology of invertebrate animals, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 130 or equivalent. (Fall)

## 208 Bioenergetics (3 or 4)

Merchant

Study of energy fixation and transfer in ecosystems and of their role in behavior, evolution, population dynamics, and species interactions. Students enrolling for 4 credits will devote one additional class meeting per week to an investigation of the nature and methods of science. Prerequisite: BiSc 154 or permission of the instructor. (Fall, odd years)

## 209 Seminar: Principles and Mechanisms of Organic Evolution (3)

Lipscomb

Current problems and issues in evolution, speciation, macroevolution, biogeography, and topics of special interest to participants. Prerequisite: BiSc 150 or equivalent. (Fall)

## 210 Methods of Study of Evolution (4)

Lipscomb

Lecture (3 hours), laboratory and field (2 hours). Review of selected topics of current interest in the study of evolution, such as principles of phenetic and phylogenetic systematics, study of biogeography, and biochemical methods of examining evolution. Laboratory fee, \$40. Prerequisite: BiSc 150 or equivalent. (Fall, even years)

- 211 Symbiosis and Evolution (3)**  
Study of the adaptations and evolution of parasites, including coevolution of parasites and hosts, competition for hosts, evolution of life cycles, and topics of special interest to participants. (Spring) Lipscomb
- 212 Seminar in Comparative Reproductive Biology (3)**  
Review of selected topics in animal reproduction, including neuroendocrine regulation, reproductive cycles and behavior, and gonadal pathology. Prerequisite: BiSc 124 or equivalent. (Spring) Burns
- 220 Seminar: Cell or Plant Biochemistry (3)**  
Course content changes each session, alternating between selected topics in cell biochemistry and plant biochemistry. May be repeated for credit. Prerequisite: BiSc 102 or 103 or 112 or equivalent. (Spring) Donaldson
- 221 Variation and Evolution in Plants (3)**  
Biosystematics of plants, covering the literature, concepts, and methodology of chemotaxonomy, breeding systems, cytogenetics, population genetics, and other studies of speciation, evolution, and classification. Prerequisite: BiSc 107 or 140 or 142 or 150. (Spring, even years) Wells
- 222 Current Topics in Cellular and Molecular Biology (1)**  
Discussion of current publications in the areas of genetic engineering, organelle biogenesis, membrane function, plant gene structure and function, and transportable elements. May be repeated for credit provided that the topic differs. Star
- 227 Seminar: Genetics (3)**  
Review of selected topics in genetics, with emphasis on current literature; topics of special interest to participants encouraged. May be repeated for credit. Prerequisite: BiSc 107 or equivalent. (Fall, odd years) Johnson
- 228 Population Genetics (3)**  
Origin, maintenance, and possible significance of genetic variation in populations. Selection, genetic drift, microevolution of species, and speciation are emphasized. Both theoretical and applied aspects of population genetics are discussed. Prerequisite: BiSc 107 or equivalent. (Fall, even years) Johnson
- 229 Cytogenetics (3)**  
Behavior of chromosomes in mitosis and meiosis as a basis for the transmission of genes from one generation to the next through reproduction and the influence of cytogenetic processes on the mechanisms of evolution. Prerequisite: BiSc 102 or 103 and 107 or equivalent. (Fall) Star
- 230 Human Genetics (3)**  
Genetic mechanisms of transmission and expression of human traits, with emphasis on biochemical and cytogenetic aspects. Prerequisite: BiSc 107 or equivalent; previous course work in cell biology or cell biochemistry strongly recommended. (Spring) Huff
- 238 Seminar: Current Topics in Phycology (3)**  
A review of current literature regarding selected aspects of algal systematics, morphology, physiology, or ecology. (Fall, even years) Huff
- 239 The Biology of Freshwater Diatoms (4)**  
The systematics, morphology, physiology, and ecology of freshwater diatoms. Field and laboratory studies emphasize familiarity with local taxa. Laboratory fee, \$40. (Fall, odd years) Laboratory
- 242 Advanced Plant Ecology (3)**  
Study of selected topics in adaptive plant strategies and physiological plant ecology. May be repeated for credit. Prerequisite: BiSc 112 or 154 or 155. (Spring, odd years) Wells
- 243 Seminar: Ecology (3)**  
In-depth study of selected topics, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 154 or equivalent. (Spring, even years) March
- 246 Analysis of Development (3)**  
Survey of current research in selected topics in experimental morphology, biochemical development, and developmental endocrinology. Emphasis on the principles and problems of pattern formation in animals. Prerequisite: BiSc 112 or equivalent. (Fall, even years) Brown
- 249 Seminar: Developmental Biology (3)**  
Discussion and reports on recent research on the endocrinological, genetic, and biochemical aspects of animal development. Prerequisite: one course in developmental biology or cell biology. May be repeated for credit. (Spring) Brown



- 252 Seminar: Neurobiology (3)** Atkins  
Study of current publications in comparative neurobiology. May be repeated for credit with instructor's permission. (Spring, even years)
- 265 Epithelial Transport (3)** Packer  
A survey of cellular mechanisms of electrolyte, water, and metabolite transport, with emphasis on osmotic and acid-base balance. (Fall)
- 272 Scanning Electron Microscopy (3)** Atkins  
Theory and practice of scanning and transmission electron microscopy, including specimen preparation, photography, and analysis of ultrastructural observations. Laboratory fee, \$65. (Spring)
- 274 Gene Regulation and Genetic Engineering (3)** Morris  
The control of gene expression as illustrated by several prokaryotic and eukaryotic model systems: discussions of recombinant DNA techniques. Prerequisite: BiSc 107. (Spring, odd years)
- 275 Introduction to Recombinant DNA Techniques (3)** Morris  
Lecture, 1 hour; laboratory, 4 hours. Basic techniques of genetic manipulation: isolation of phage and plasmid DNA, cloning of genes, transformation of bacteria, mutagenesis of cloned genes, and other techniques. Prerequisite: BiSc 102 or 107 or 137 or equivalent and permission of instructor. Laboratory fee, \$40. (Fall, even years)
- 295 Research (arr.)** Staff  
Investigation of special problems. May be repeated for credit. (Fall and spring)
- 299-300 Thesis Research (3-3)** Staff  
**398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## CHEMICAL TOXICOLOGY

See Forensic Sciences.

## CHEMISTRY

Professors T.P. Perros, W.E. Schmidt, D.G. White, J.B. Levy, N. Filipescu, E.A. Careas, D.A. Rowley, D. Ramaker (Chair), M. King, A. Montaser  
Associate Professors H. Sambe (Research), J.H. Miller  
Assistant Professorial Lecturer S.M. Barkin  
Assistant Professors D. DiLella, D.L. Sedney (Research)

**Master of Science in the field of chemistry**—Prerequisite: a bachelor's degree with a major in chemistry from this University, or an equivalent degree

Required: the general requirements stated under the Graduate School of Arts and Sciences. Course work must include Chem 213 and 221 and at least two of the following: Chem 207, 238, and 251. Proficiency in computer programming must be demonstrated. Candidates are required to pass a Master's Comprehensive Examination

Thesis option—30 credit hours of approved courses are required, including Chem 299-300 Thesis Research, which may be in analytical, inorganic, organic, or physical chemistry

Nonthesis option—36 credit hours of approved courses are required, including Chem 299-300 Thesis Research, which may be in analytical, inorganic, organic, or physical chemistry. Up to 9 credit hours in other departments relevant to the student's area of interest may be included in the program, subject to the approval of the Department of Chemistry. Students who are or will be employed in organizations dealing with science, technology, and public policy programs may wish to select from the following courses: PSc 203, 217, 222, 223, 252, PAd 260, 301; Mgt 233, 234.

**Master of Science in the field of geochemistry (an interdepartmental degree offered by the Departments of Chemistry and Geology)** Prerequisite: a bachelor's degree with a major in chemistry or geology from this University, or an equivalent degree

Required: the general requirements stated under the Graduate School of Arts and Sciences, including Chem 111-12, 213 or other upper-level chemistry course approved by the advisor, and 299-300, and Geol 141, 241 or 243, and 249. The Master's Comprehensive

Examination must be taken before registration for the second half of the thesis work. Stat 129 or an equivalent course approved by the Department of Chemistry or Geology must be passed.

*Bachelor of Science-Master of Science in the field of chemical toxicology*—See Forensic Sciences.

*Doctor of Philosophy in the field of chemistry*—Required: the general requirements stated under the Graduate School of Arts and Sciences. Chem 207, 213, 221, 235, and 252 are normally required of the doctoral student, in addition to other courses and requirements as determined by consultation with the departmental program committee. Proficiency in computer programming must be demonstrated. The General Examination requirement is replaced by a two-part requirement consisting of a cumulative examination system and a proposal for a research problem.

**Research fields:** analytical and molecular spectroscopy, chemical instrumentation, combustion chemistry, chemical toxicology, fluorine chemistry, forensic chemistry, geochemistry, organic synthesis natural products, photochemistry, structure reactivity studies, surface science, theoretical chemistry, trace analysis, transition metal complexes.

Ph.D. students in chemistry may substitute up to 12 hours of Dissertation Research (Chem 399) in the form of course work jointly approved by the Chemistry Department and the Science, Technology, and Public Policy program. The purpose of this option is to provide a useful background for chemistry doctoral students who may be employed in government agencies dealing with science, technology, and public policy programs. The 12 hours may be selected from the following courses: PSc 203, 217, 222, 223, 252, PAD 260, 261; Mgt 233, 234.

*Doctor of Philosophy in the field of geochemistry (an interdepartmental degree offered by the Departments of Chemistry and Geology)*—Required: the general requirements stated under the Graduate School of Arts and Sciences, including Stat 129 and either Stat 118 and 119, or 91, and the satisfactory completion of the General Examinations in four fields including chemistry and geochemistry.

**Graduate Placement Examinations:** All entering students in the master's and doctoral programs in the field of chemistry are required to take the American Chemical Society Graduate Level Placement Examinations, given by the Department of Chemistry, prior to registration in the Graduate School of Arts and Sciences. The four placement examinations (in the disciplines of analytical, organic, inorganic, and physical chemistry) are of the multiple-choice type. These tests are designed to cover the subject matter in the disciplines generally taught in modern undergraduate programs preparatory for graduate work in chemistry, and the results are used by the department to advise the individual student in planning a program of courses appropriate to the student's background.

All graduate students are required to participate in the seminar and colloquium programs.

Upon consultation with course instructors, specific prerequisites may be waived for the particular courses.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

#### 207 Chemical Bonding (3)

Quantum mechanics, approximate methods, electron spin, Pauli principle, atomic and molecular structure. Prerequisite: Chem 112. (Fall)

#### 211-12 Physical Chemistry (2-1)

Same as Chem 111-12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Academic year)

#### 213 Chemical Thermodynamics (3)

Application of thermodynamics to chemical problems. Emphasis on statistical calculation of thermodynamic properties. Prerequisite: Chem 112 or 212. (Spring)

#### 218 Molecular Spectroscopy (3)

Applications of quantum mechanics and group theory to the interpretation of electronic, vibrational, rotational, and magnetic resonance spectroscopy. Prerequisite: Chem 207. (Spring, odd years)

Remaker

Miller, Ramaker

Miller, Ramaker

DeLore



- 220 Selected Topics in Analytical Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of analytical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit
- 221 Advanced Analytical Chemistry I (3)** Montaser  
Theory and application of recent spectrometric methods of analysis, including advances in optimization techniques, optical instrumentation, atomic spectrometry, laser-based analytical techniques, X-ray methods, and surface analysis techniques. Prerequisite: Chem 122. (Fall)
- 222 Advanced Analytical Chemistry II (3)** Schmidt  
Theory and application of electroanalysis and separations by physicochemical methods. Prerequisite: Chem 122. (Spring, even years)
- 230 Selected Topics in Inorganic Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of inorganic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit
- 233 Organometallic Chemistry (3)** White  
Survey of organometallic compounds, with emphasis on the compounds of lithium, boron, aluminum, silicon, and the transition metals and the catalytic role of certain organotransition metal complexes. Prerequisite: Chem 235 and 251, or permission of instructor. (Spring, even years)
- 235-36 Advanced Inorganic Chemistry (3-3)** Staff  
Application of modern chemical theories to inorganic substances and reactions; detailed study, developed from the periodic table, of the chemistry of the more common elements; introduction to bioinorganic and organometallic chemistry. Prerequisite to Chem 235: Chem 112, 152. Prerequisite to Chem 236: Chem 235. (Academic year)
- 240 Selected Topics in Physical Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of physical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit
- 250 Selected Topics in Organic Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in organic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit
- 251-52 Advanced Organic Chemistry (3-3)** Filipescu  
Synthesis, reactions, and properties of organic compounds, fundamental theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 112, 152. Prerequisite to Chem 252: Chem 251. (Academic year)
- 257 Physical-Organic Chemistry (3)** Levy  
The transition state theory of chemical kinetics, applications to reaction mechanisms, kinetic isotope effects, linear-free energy relationships, concentrated and "super" acids, Woodward-Hoffman rules, free radical reactions. Prerequisite: Chem 252 or permission of instructor. (Fall, odd years)
- 258 Synthesis and Structure Determination in Organic Chemistry (3)** Staff  
The design of synthesis for complex organic molecules, survey of modern synthetic methods, including asymmetric induction, spectroscopic methods of structure determination. Prerequisite: Chem 251 or permission of instructor. (Fall, even years)
- 259 Polymer Chemistry (3)** Barkin  
A study of the preparation, properties, and structure of macromolecules. Prerequisite: Chem 152 and 110 or 111 or permission of instructor. (Fall, odd years)
- 260 Selected Topics in Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in chemistry. One to three topics may be chosen for a given semester. May be repeated for credit
- 295 Research (arr.)** Staff  
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 credit hours. (Fall and spring)

- 298 Independent Study (3)**  
Limited to master's degree candidates. A survey of a topic approved by departmental staff and resulting in a written report, and the presentation of a seminar.
- 299-300 Thesis Research (3-3)**
- 398 Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit.
- 399 Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

### CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

- Professors H. Liebowitz, J.E. Feir, T.G. Toridis, J. Eftis, R. Goulard, K. Mahmood, A.M. Kiser (Chair), M.K. Myers, J.-N. Yang, R.E. Kaufman, D.M. Esterling, C.M. Gilmore, J.L. Whitesides, T.P.G. Liverman, V. Klein, D.L. Jones, B.M. Kramer, C.A. Garriss, J.C. Lamb III, C.D. Walberg (Research), J.D. Lee
- Adjunct Professors W.P. Reid, M.P. Gaus, B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, A.G. Adamantziades, M. Yachnis, C.F. Scheffey, B. Dendrou
- Professorial Lecturers N.L. Basdekas, D.R. Levin, W.D. Erickson, G.D. Love, S.-C. Liu, T.-J. Zien, D.J. Michel, W.D. Jackson, B. Miller, E.F. Skelton, C.J. Astill, P.D. Maycock, L.C. Hardin, R.H. Tolson, J. Sobieski, D.U. Gubser, J.I. Bregman, E. McCafferty, R.C. Macos, P.S. Lam, E.C. Yates, Jr., C. Ng, W.J. Boettinger, G.C. Everstine, J.A. Sprague, R.W. Barnwell, D.L. Dwyer, F. Farassat, C.G. Interrante, A. Kehnemui, T. Kusuda, C.R. Hauert, D.W. Coder, D.R. Mulville, J.P. Raney, D.R. Levin
- Associate Professors M.I. Haque, E.T. Moyer, Jr., R. Lohner (Research), S. Sarkani
- Adjunct Associate Professor M.A. Imam
- Associate Professorial Lecturers D.W. Ellison, R.Y.-Y. Ting, M.C. Cullingford, F.L. Wingham, Jr., A.B. Wardlow, Jr., M.M. Mikulas, Jr., J.C. Coolbaugh, K. Khozemeh, R. Bowles, W.D. Burrows, C. Winklehaus, R.F. Jones, Jr., S.C. Mehrotra, S. Basu, J.S. Rao, R. Chung, S.M. Joshi, R.E. Lindberg, Jr., T.A. Zang, Jr., S.L. Zimmerman, C.G. Frantz, A. Ghamarian, J.F. O'Dea, W.B. Fichter, L.B. Garrett, P.N. Majumdar, J.N. Moss, G.L. Simon
- Assistant Professors M.I. Anjum (Visiting), A.D. Cutler (Research)
- Assistant Professorial Lecturers R.C. Montgomery, R. Lee, T.L. Walton, Jr., G.E. Heche, M.P. Gottlieb, W. Kulyk, E.T. Von Briesen, N.F. Knight, Jr., J.M. Luckring, K.G. Garrahan, A.L. Dinsbacher, H. Biswas, A.A. Oni, S.H. Yang, R.P. Weston

See the School of Engineering and Applied Science for programs leading to the master's professional, and doctoral degrees.

### CIVIL ENGINEERING

- 201 Design of Metal Structures (3)**  
Structural behavior of metal structures, conception and design of advanced structural components and systems, hysteretic behavior, plastic design principles, box-type girders, cable systems, composite girders, and special topics. Prerequisite: CE 191 or equivalent. (Spring)
- 202 Design of Reinforced Concrete Structures (3)**  
Structural behavior of reinforced concrete structures, conception and design of structural components, prestressed concrete, slabs, ultimate strength and deterioration, box-type girders, hysteretic behavior, safety considerations, and special topics. Prerequisite: CE 192 or equivalent. (Fall)
- 203 Prestressed Concrete Structures (3)**  
Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: CE 192 or equivalent. (Spring)
- 204 Applied Soil Mechanics I (3)**  
Theories of soil strength, bearing capacity of shallow foundations and their design, deep foundations, including pile types and design criteria, theories of lateral earth pressure with applications, stability analyses of slopes. Prerequisite: approval of department. (Spring, even years)
- 205 Applied Soil Mechanics II (3)**  
Nature of soil, including geological and pedological aspects; flow of water in soil; seepage involving foundations, dams, and wells; stress distribution in earth.



- masses; one- and three-dimensional theories of consolidation; analysis of settlement. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of department. (Fall, even years) Staff
- 206 **Geotechnical Engineering (3)** Principles of soil mechanics and structural mechanics applied to the analysis and design of spread footings and mat foundations, pile foundations, retaining structures, including sheeting and bracing systems, and waterfront structures. Problems associated with subsurface exploration, dewatering excavations, and underpinning. Prerequisite: approval of department. (Spring) Staff
- 207 **Soil Dynamics (3)** Stress-strain behavior of soil under transient and repeated loads, effects of earthquakes on foundations and earth dams, design of machinery foundations. Prerequisite: approval of department. (Fall, odd years) Staff
- 208 **Rock Engineering (3)** Classification and properties of rock; nature of rock masses and rock discontinuities, field exploration, methods of excavation, design and applications to foundation slopes, tunnels, and chambers in rock. Prerequisite: approval of department. (Fall, odd years) Staff
- 209 **Probabilistic Methods in Geotechnical Engineering (3)** Review of probability concepts, probabilistic theory for particulate media, variability of soil properties, applications of reliability analysis to geotechnical problems, such as shallow foundations and soil slopes; decision analysis in geotechnical engineering. (Fall, even years) Staff
- 210 **Methods of Structural Analysis (3)** Modern methods of analysis of statically indeterminate structures, matrix analysis based on flexibility, stiffness, energy and variational methods, substructuring techniques, consideration of plastic collapse of structures, introduction to the finite element method. Prerequisite: graduate status. (Fall) Toridis and Staff
- 211 **Environmental Chemistry (3)** Principles of chemistry of natural waters, water supplies, wastewaters, hazardous wastes. Stoichiometry, equilibrium, solubility, kinetics, organic chemistry, biochemistry, analytical techniques. Examples from water wastewater practice to illustrate applications. Prerequisite or concurrent registration: CE 240. (Fall, odd years) Lamb and Staff
- 212 **Open Channel Flow (3)** Types and regimes of flow; energy and momentum principles, uniform flow, gradually varied flow, spatially and rapidly varied flow. Flow in nonprismatic channels. Unsteady flow; dam break problem, flood routing. Prerequisite: CE 193 or ME 221. (Fall) Mahmood and Staff
- 213 **Hydraulic Engineering (3)** Hydraulic design of conveyance, regulating, and measurement structures. Design for spillways, energy dissipators, inlet and outlet works related to dams. Forces on hydraulic structure and stability analysis. Hydraulic turbines and pumps. Design considerations for flow through pipes. Transients and cavitation. Prerequisite: CE 193 or approval of department. (Spring) Haque and Staff
- 214 **Design of Dams (3)** Project planning and investigations. Types of dams, design of earth-rock fill dams, stability analysis, foundation treatment, wind-wave protection. Construction methods for dams. Reservoir sedimentation. Safety inspection of dams. Prerequisite: CE 193 or graduate status. (Spring, even years) Mahmood and Staff
- 215 **Urban Construction Technology (3)** Precedents and contemporary trends in urban housing, building, and planning technology. Prerequisite: approval of department. (As arranged) Staff
- 216 **Advanced Hydrology (3)** Precipitation, evaporation, and transpiration. Soil physics; stream flow, drainage basins, hydrograph analysis, and stream-flow routing. Design criteria, flood frequency statistics and analysis, flood forecasting and control, water-supply forecasting. Prerequisite: CE 195 or equivalent. (Spring, even years) Mahmood
- 219 **Groundwater and Seepage (3)** Permeability theory of groundwater flow, flow nets, analogs, computer solutions, applications to engineering problems such as excavation dewatering, flow through dams, stabilization of earth slopes. Prerequisite: approval of department. (Spring) Haque and Staff

- 220 Urban Transportation Engineering (3)**  
Introduction to urban transportation planning. Analysis of urban transportation requirements. Evaluation procedure for selecting among alternative solutions. **Prerequisite:** approval of department. (Fall, odd years)
- 221 Pavement and Runway Design (3)**  
Pavement types, wheel-load characteristics; stresses in pavements and subgrades, empirical methods of design of flexible and rigid highway and airfield pavements; general principles of runway design. **Prerequisite:** CE 202, 204 or 205. (Spring, odd years)
- 222 Stations and Terminals (3)**  
Unified treatment of the functions and operations of stations and terminals of transportation systems; emphasis on specifications and planning criteria. Problems of locating the facility, passenger and freight handling, intramodal and intermodal interfacing, communication and control. **Prerequisite:** approval of department. (Spring, even years)
- 223 Traffic Engineering (3)**  
Roadway traffic capacity and other road network performance measures, methods of characterizing steady and unsteady traffic flow phenomena, traffic behavior monitoring techniques, instruments, and data processing, traffic control signalization theory and practical implementation. **Prerequisite:** approval of department. (Fall, even years)
- 237 Advanced Sanitary Engineering Design (3)**  
Elements of design including basic parameters and hydraulic requirements. Layout and design of water supply and wastewater systems, pumping stations, and treatment plants. Plant expansions and modifications. **Prerequisite or concurrent registration:** CE 241. (Fall, even years)
- 240 Principles of Environmental Engineering (3)**  
Basic concepts of water, air, and terrestrial environments and interrelationships among them. Principles of environmental chemistry and microbiology. Assessment of environmental quality and impacts. Environment and health. Water and wastewater systems. Legal and regulatory controls. (Fall)
- 241 Water and Wastewater Treatment Processes (3)**  
Theory and application of commonly used processes. Sedimentation, coagulation, filtration, disinfection, gas transfer, activated sludge, trickling filters, oxidation ponds, sorption, and sludge stabilization and disposal. Process combinations to produce treatment systems. (Spring, even years)
- 243 Environmental Impact Assessment (3)**  
Public policy and legislation on environmental quality. Methods for assessing impacts of engineering projects. Technology for assessing impacts on air, water, and land environments, applied to transportation facilities, water and wastewater facilities, industrial and community development. (Fall, odd years)
- 250 Advanced Metal Structures (3)**  
Conception, analysis, and design of low-rise and high-rise buildings by elastic and inelastic methods, suspended roofs, earthquake considerations, and unique structural systems. **Prerequisite:** CE 201 or equivalent. (Fall)
- 251 Advanced Reinforced Concrete Structures (3)**  
Conception, analysis, and design of low-rise and high-rise buildings by ultimate strength methods, precast systems, progressive collapse, earthquake considerations, domes, folded plates, shell-type structures, and special topics. **Prerequisite:** CE 202 or equivalent. (Spring)
- 253 Reliability Analysis of Engineering Structures (3)**  
Probability theory, theory of structural reliability, probabilistic analysis of strength and loads, risk and reliability function, empirical distribution, probability plot. The design service life, method of perturbation, Monte Carlo simulation. Fatigue and fracture, proof testing, inspection and repair-replacement, maintenance. **Prerequisite:** approval of department. (Fall, odd years)
- 254 Special Topics in Structural Engineering (3)**  
Selected problems, such as thermal stresses in structural systems, advanced probabilistic structural mechanics, structural design for dynamic loads, repeated loads, or advanced structural applications. Topic announced in the Schedule of Classes. May be repeated for credit. **Prerequisite:** CE 210 and approval of department. (As arranged)



- 255 Introduction to Ocean and Coastal Engineering (3)** Feir and Staff  
Incompressible fluid mechanics and applications to analysis of wave motions, circulations, and other free surface flows in coastal and offshore regions; wave spectra, water-level fluctuations, tides, tsunamis, oscillations, and storm surges; wind-generated waves, beaches, sediment transport, wave forces on coastal and offshore structures. Prerequisite: ApSc 115 or equivalent. (Fall)
- 256 Coastal Processes (3)** Feir and Staff  
Coastal sediment properties and analysis, longshore transport processes and rates; sediment budget; response of beaches to wave action and structures, tidal inlets, mechanical bypassing; beach nourishment, wind transport in sand dune stabilization, sediment tracing. Prerequisite: CE 255. (Spring, even years)
- 257 Harbor and Coastal Engineering (3)** Feir and Staff  
Applications of principles of ocean and coastal engineering to coastal protection structures, harbor design and navigation, breakwaters, seawalls, quays, docks; sediment transport in the coastal regime, estuaries and deltas; dredging for maintenance of channels and harbors. Prerequisite: CE 255. (Spring, odd years)
- 258 Application of Probability Methods in Civil Engineering (3)** Feir and Staff  
Uncertainty in real-world information; basic probability concepts and models; random variables; useful probability distributions, statistical estimation of distribution parameters from observed data; empirical determination of distribution models, testing hypothesis; regression and correlation analyses, decision theory. (Fall, even years)
- 261 Analysis of Plates and Shells (3)** Staff  
Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations, theory of folded-plate structures. Theory of curved surfaces, general linear bending theory and its simplification to membrane theory; bending stresses in shells of revolution, shallow-shell theory. Prerequisite: graduate status. (Spring)
- 262 Design of Plate and Shell Structures (3)** Toridis and Staff  
Design of long-span plate and shell roof structures in reinforced concrete and metal, design of containers for fluids and granular materials, computer applications in the analysis of such structures. Prerequisite: CE 201, 202, 261; or equivalent. (Fall, alternate years)
- 263 Theory of Structural Stability (3)** Toridis and Staff  
General criteria for stability, buckling of elastic and inelastic columns and frames, torsional and lateral buckling, variational methods. Buckling of plates and shells under static loads, stability of stiffened structures, effect of imperfections and boundary conditions. Prerequisite: graduate status. (Fall)
- 265 Special Topics in Geotechnical Engineering (3)** Staff  
Selected topics, such as rheology of soils, computer applications, excavating and tunneling, or ocean engineering problems. May be repeated for credit. Prerequisite: approval of department. (As arranged)
- 266 Design to Resist Natural Hazards I: Effects of Extreme Wind (3)** Toridis and Staff  
Characterization of winds in hurricanes, tornadoes, and extreme extratropical storms, variation of velocity and direction with elevation, probability and risk. Static wind forces on structures, design of wind-bracing systems. Aeroelastic effects and vortex action, galloping, flutter. Approaches to suppression of oscillations. Prerequisite: EngS 257 or approval of department. (Fall, odd years)
- 267 Design to Resist Natural Hazards II: Earthquakes (3)** Toridis and Staff  
Origins and characterization of earthquakes, zoning maps, recurrence intervals, and risk assessment. Code requirements, earthquake spectra, reserve strength in post-elastic behavior. Response of multiple-story buildings, bracing systems, torsional and P-Delta effects. Response of other types of structures. Prerequisite: EngS 257 or approval of department. (Fall, even years)
- 271 Theoretical Marine Hydromechanics (3)** Feir and Staff  
Derivation of the fundamental equations and boundary conditions of fluid media, application of potential-flow theory to fluid motion around two- and three-dimensional bodies, perturbation concepts. Derivation of force and movement of bodies in calm and disturbed water. Prerequisite: approval of department. Offered off campus only. (As arranged)

- 272 **Microbiology for Environmental Engineers** (3) Lamb and Staff  
Principles of microbiology and applications to lakes, streams, hazardous wastes and biological treatment systems. Methods for evaluating impacts of wastewater and hazardous wastes on ecological systems. Concepts of limnology, including limiting of nutrients and control of nuisance growths. (Spring, even years)
- 273 **Advanced Treatment Processes** (3) Lamb and Staff  
Principles and applications of advanced treatment systems for water, wastewater and hazardous wastes, including: biological nutrient removal, oxidation-reduction processes, stripping, sorption, membrane processes, chemical precipitation others. Prerequisite: CE 241. (Spring, odd years)
- 274 **Mechanics of Water Waves** (3) Feir and Staff  
Irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attenuation. Water waves of finite amplitude, shallow-water theory, tides, bores, long-waves theory, conoidal and solitary waves. Wave generation by wind. Wave breaking and reflexion. Prerequisite: ApSc 213 and permission of instructor. (Fall, even years)
- 275 **Special Topics in Ocean Engineering** (3) Feir and Staff  
Selected topics, such as marine aspects of viscous-flow theory, interfacial (internal) waves, or applied random processes in ocean and coastal engineering. May be repeated for credit. Prerequisite: approval of department. (As arranged)
- 276 **Water Resources Planning and Control** (3) Staff  
The parameters of water resources planning and control, economics of water resources and related natural resources, economics of water-quality control, physical parameters of water resource development, water resources law. Prerequisite: approval of department. (Fall, even years)
- 277 **Industrial Waste Treatment** (3) Lamb and Staff  
Types of industries, waste sources. Characteristics, measurements, and evaluation. Minimization and reuse. Treatment process selection, development, and design. Regulations, permits, standards, monitoring, and pretreatment. Prerequisite: CE 240 or approval of department. (Fall, odd years)
- 278 **Pollution Transport System** (3) Staff  
Distribution of pollutants in natural waters and atmosphere, diffusive and advective transport, mathematics for stream pollutant deoxygenation rates, groundwater pollution transport, sediment transport, thermal transport, numerical simulation of pollutant transports in streams and estuaries. Prerequisite: CE 192, ME 131. (Fall, even years)
- 279 **Introduction to Hazardous Wastes** (3) Lamb and Staff  
Regulations, including RCRA and Superfund. Transport and fate of hazardous substances. Elements of environmental toxicology, risk assessment, and hazard ranking. Monitoring, data collection, and evaluation. Waste minimization. Case histories. Prerequisite: CE 240 or approval of department. (Spring, odd years)
- 281 **Special Topics in Water Resources** (3) Mahmood and Staff  
Morphometric properties of drainage basins, drainage network analysis, hydraulic geometry of streams, advanced hydraulics of alluvial channels, modeling of drainage basins, computer applications, stochastic hydrology. Prerequisite: approval of department. (As arranged)
- 282 **Hydraulic Modeling** (3) Mahmood and Staff  
Dimensional analysis and similitude. Types of models—physical, mathematical. Distortions in physical models. Erodible bed models. Prerequisite: CE 193. (Fall, alternate years)
- 283 **Special Topics in Environmental Engineering** (3) Lamb  
Selected topics, such as in-depth evaluation of current issues in the field, new technological approaches for resolving environmental quality problems, environmental health matters, handling of residuals, and engineering methodologies. (As arranged)
- 284 **Numerical Methods in Water Resources** (3) Mahmood and Staff  
Use of microcomputers in water resources. Elements of finite difference schemes, basic operations, convergence, stability, and consistency. Nonuniform flow and error analysis, unsteady laminar flow, diffusion problems, unsteady flow in open channels, water hammer, seepage flow, and diffusion-dispersion problems. Prerequisite: approval of department. (Spring)
- 298 **Research** (arr.)  
Basic research projects, as arranged. May be repeated for credit.



- 299-300 **Thesis Research** (3-3) Staff
- 310 **Sedimentation Engineering** (3) Mahmood and Staff  
Problems of erosion and sedimentation. Properties of sediment. Initiation of motion. Suspension of sediment and sediment discharge theories. Sedimentation measurements. Economic and legal aspects. Prerequisite: CE 212 or approval of department. (Fall, odd years)
- 311 **Mechanics of Alluvial Channels** (3) Mahmood and Staff  
Physical processes in drainage basins and channels. Channel forms and bed forms. Hydraulics and sediment transport in alluvial channels. Design of stable channels. Qualitative and quantitative response of rivers. Channel stabilization, navigation channels. Case studies including environmental impacts. Prerequisite: CE 212 or approval of department. (Spring, odd years)
- 312 **Advanced Hydraulics** (3) Mahmood  
Theory of unsteady flow. Diffusion and dispersion through pipes and open channels. Numerical solutions using finite element and finite difference methods. Prerequisite: CE 212 or approval of department. (Spring, even years)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## MECHANICAL ENGINEERING

An asterisk indicates that a course is offered at NASA-Langley Research Center and may be offered on campus when arranged.

- \*201 **Computational Fluid Dynamics Laboratory** (1) Staff  
Development of computer programs for solving fluid dynamics problems for incompressible and compressible inviscid and viscous flows. Prerequisite or concurrent registration: ME 277. (As arranged)
- \*202 **Computational Aerodynamics Laboratory** (1) Staff  
Use of computational aerodynamics methods for conducting engineering studies of practical low-speed, transonic, and high-speed flows. Prerequisite or concurrent registration: ME 222. (As arranged)
- \*203 **Experimental Techniques in Aerodynamics** (3) Staff  
The wind tunnel, instrumentation devices, boundary corrections, testing procedures, data reduction; laboratory experiments including calibration of instruments, test-section calibrations, and two-dimensional and three-dimensional model tests. Prerequisite: approval of department. (As arranged)
- 204 **Advanced Instrumentation Techniques** (3) Jones and Staff  
Pressure and temperature sensors, shadowgraph, schlieren and interferometer systems, laser holography, laser Doppler velocimetry, signal conditioning, use of amplifiers; digital techniques: signal multiplexing, use of computers; error analysis and data handling. Prerequisite: approval of department. (Fall, odd years)
- \*208 **Research in Computational Fluid Dynamics** (1 to 3) Staff  
Specific research projects in conjunction with experimental laboratory course or computational labs. Prerequisite: approval of department. (As arranged)
- 218 **Design of Floating and Submerged Marine Vehicles** (3) Staff  
Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles, effects of submergence and deep submergence; hydrofoil and vertical jet action; structural considerations. Prerequisite: EngS 228. (As arranged)
- 221 **Intermediate Fluid Mechanics** (3) Myers and Staff  
Continuum, kinematics of fluids; stress and strain tensors; fundamental equations of viscous compressible flows. Irrotational flows; sources, sinks, doublets, and vortices. Laminar flow of viscous incompressible fluids; boundary-layer concept. Prerequisite: approval of department. (Fall)
- 222 **Applied Aerodynamics** (3) Goulard and Staff  
Introduction to practical and computational methods for solving two-dimensional and three-dimensional aerodynamics problems. Linear methods, nonlinear potential methods, coordinate transforms, and boundary-layer methods. Prerequisite: EngS 284, ME 221. (As arranged)

- 224 Fundamentals of Combustion Engines (3)** Goulard and Staff  
 Classification of combustion engines. External- and internal-combustion engines, ideal cycle analysis; practical cycle analysis; computerized cycle analysis; combustion and knocking; carburetion and fuel injection; ignition systems; combustion chamber; piston-engine, rotary-engine, and turbomachinery mechanical and balance. Prerequisite: approval of department. (As arranged)
- 225 Turbomachinery I (3)** Garris and Staff  
 Turbine, compressor, and pump types and uses; dimensional analysis of turbomachines; cycle analysis of gas and steam turbines; energy interchange in fluid machinery; design, characteristics, and performance of turbines, compressors and pumps; comparison of types of turbines, compressors, and pumps. Prerequisite: ME 221. (Fall, odd years)
- 226 Turbomachinery II (3)** Garris and Staff  
 Aerodynamics of aerofoils, flow in cascades, axial-compressor and axial-turbine aerodynamic design, compressor and turbine matching, Combustion fundamentals, combustion chemistry, and gas-turbine combustion chamber design. Prerequisite: ME 225. (Spring, odd years)
- 227 Viscous Flow (3)** Goulard and Staff  
 Exact solutions of Navier-Stokes equations; the laminar boundary-layer theory; Reynolds stresses and turbulence; internal, boundary-layer, and mixing flows. Applications to heat and mass transfer and to reacting flows. Prerequisite: ApSc 213, ME 221, or equivalent. (Fall, even years)
- 231 Hydrodynamics (3)** Garris and Staff  
 Inviscid flows in two and three dimensions and irrotational flow theory; conformal mapping and applications. Helmholtz theorems and vorticity dynamics. Applications, such as finite wing theory, instabilities. Free surface flow, Froude numbers, sheet vortex. Prerequisite: ME 221 or equivalent. (Spring)
- \*233 Aeroelasticity I (3)** Whitesides and Staff  
 Static and dynamic structural deformations; static aeroelasticity (structural deformation, divergence, control effectiveness, and reversal); dynamic aeroelasticity (flutter, response to gusts and turbulence); unsteady aerodynamics for 2-D wings; strip theory for 3-D lifting surfaces; piston and Newtonian flow theories. Prerequisite: EngS 257, ME 221. (As arranged)
- \*234 Aeroelasticity II (3)** Whitesides and Staff  
 Steady and oscillating 3-D planar and nonplanar lifting surfaces in subsonic and supersonic flow. Continuous-load and discrete-load methods. Time-dependent motion of arbitrary configurations in subsonic, transonic, and supersonic flow. Inviscid and viscous flows. Aeroelasticity in structural design. Prerequisite: ME 233. (As arranged)
- 235 Compressible Flow (3)** Mvers and Staff  
 Thermodynamics and physical properties of gases, fundamental equations of a compressible inviscid fluid, choking, small-perturbation theory, role of entropy in supersonic flow, shock-wave interactions, holograph transformation; transonic flow theory, method of characteristics. Prerequisite: ApSc 213, ME 221, or equivalent. (Spring, even years)
- 237 Propulsion (3)** Cutler and Staff  
 Basic concepts of propulsion, energy transformations in propulsive flows, gas dynamics of combustion, Thermal and propulsive efficiencies. Cycle and engine component analysis. Intake, nozzle performance. Drag and thrust generation. Augmentation. Propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: ME 155 or equivalent. (Spring)
- 238 Energetics of Fluid Flow (3)** Staff  
 Classification of fluids and criteria for identifying flow regimes: continuum and rarefied. Dimensional analysis and similitude. High-speed chemically reacting flows; aerothermochemistry. Space propulsion. Prerequisite: ApSc 213, ME 221. (As arranged)
- 240 Kinematic Synthesis (3)** Kaufman and Staff  
 Techniques for the analysis and synthesis of function, path, and motion generating mechanisms. Methods for the dimensional design of mechanisms. Computer-aided techniques for the optimal design of planar linkages. Review of recent developments and current research. Term project. Prerequisite: ME 190 or equivalent. (Spring, even years)



- 241 Computer Models of Physical and Engineering Systems (3)** Kaufman and Staff  
Reduction of physical and engineering systems to simplified physical and mathematical models. Manipulation of models using PASCAL programming. Numerical algorithms for optimization, graph identification, mini-sum arithmetic, and searching. Styles of problem solving. Prerequisite: ME 117. (Spring)
- 242 Advanced Mechanisms (3)** Kaufman and Staff  
Emphasis on spatial kinematics. Analysis and synthesis of mechanisms. Analytical techniques using matrices, dual numbers, quaternion algebra, finite and instantaneous screws, theory of envelopes. Applications to design of linkages, cams, gears. Use of digital computers in mechanism analysis and design. (Spring, odd years)
- 243 Advanced Mechanical Engineering Design (3)** Jones and Staff  
Design of mechanical engineering systems and components, requiring the integration of engineering disciplines. Emphasis on use of computer-aided design (CAD) methods, including computer graphics and finite element analysis, and completion of a design project. Prerequisite: approval of department (Fall)
- 245 Robotic Systems (3)** Kramer and Staff  
Classification, features, and applications of industrial robots. Special descriptions and transformations, forward and inverse kinematics. Jacobian matrix, velocities and static forces, manipulator dynamics and controls. Robot actuators, transmissions, sensors, and effectors, and programming. Prerequisite: ApSc 113, ME 182, and programming ability. (Fall)
- 246 Electromechanical Control Systems (3)** Kaufman and Staff  
Advanced techniques for system synthesis, compensation, and stabilization. Linear and nonlinear characterization of control components. Time domain analysis and synthesis. Introduction to digital control theory and its applications. Prerequisite: ME 182 or equivalent. (Fall)
- 247 Seminar: Aircraft Design I (3)** Whitesides and Staff  
Designing an aircraft to specifications. Regulatory requirements, state-of-the-art limitations, computer-aided design, integration of aircraft components, economic considerations, and iterations to final configuration to obtain specified mission profile. Prerequisite: approval of department. (As arranged)
- 248 Seminar: Aircraft Design II (3)** Whitesides and Staff  
Aircraft design in relation to prescribed mission requirements, different configurative concepts, detail design features. Estimation of weight, size, and power of an aircraft to satisfy mission specifications; design trade-offs and compromises. Prerequisite: approval of department. (As arranged)
- 249 Spacecraft Design (3)** Walberg and Staff  
Computer-aided design of spacecraft and satellites to meet specific mission requirements. Environment, propulsion, structure, heat transfer, orbital mechanics, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (As arranged)
- 250 Launch Vehicle Design (3)** Walberg and Staff  
Computer-aided design of hypersonic launch vehicles to meet specific mission requirements. Propulsion, structures, flight path, aerothermochemistry, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (As arranged)
- 251 Computer-Integrated Manufacturing (3)** Kramer and Staff  
Automation techniques for processing metals, polymers, and composites. Use of sensing and process modeling in process control. Numerical control and robot applications and limitations. Integration, scheduling, and tool management in the computer-integrated factory. Quality control. Social and economic considerations in CIM. Prerequisite: ME 192 or equivalent. (Fall)
- 252 Projects in Computer-Integrated Design and Manufacturing (3)** Kramer and Staff  
Applications of the concepts of computer-integrated manufacturing to group projects, culminating in written and oral presentations. Robot programming, vision-guided assembly, force sensing, fixturing, and end-effector design for practical applications. Factory simulation, part scheduling, and NC program verification algorithms. Prerequisite: ME 251. (Spring)
- 253 Tribology (3)** Staff  
Fundamentals of the friction, wear, and lubrication of metals, polymers, and ceramic and composite materials. Theories of friction and wear, techniques for

- surface characterization, wear coatings, solid and boundary lubrication. Tribological problems in the application of ceramic components. Prerequisite: CE 166 or equivalent. (As arranged) Garrie and Staff
- 255 **Urban Transportation Technology** (3)  
Alternative transportation modes including bus, rail, and new technology. Includes system operations, energy and environmental impacts, route constraints, suspension and switching systems, life-cycle costs, and measures of system effectiveness. Prerequisite: approval of department. (As arranged) Kiper and Staff
- 257 **Energy Systems Analysis I** (3)  
Analysis of energy resources and conversion devices. Statistical data analysis, forecasting, I/O, and net energy analyses, mathematical modeling. Prerequisite: approval of department. (Fall) Kiper and Staff
- 258 **Energy Systems Analysis II** (3)  
Life-cycle costing, Second Law (energy) analysis, technological assessment, computer-assisted synthesis (CAS), society-technology interfaces. It is recommended that ME 257 and 258 be taken in sequence. Prerequisite: approval of department. (Spring) Kiper and Staff
- 259 **Solar Heating Systems** (3)  
Methods of solar energy collection and storage. Theory of flat-plate collectors, solar energy system analysis, design of solar water-heating and space-heating systems, economics of solar heating systems. Passive solar heating systems. Solar industrial process heat. Prerequisite: ME 187 or equivalent. (Fall, odd years) Kiper and Staff
- 260 **Heating and Air-Conditioning of Buildings** (3)  
Heating and cooling load calculations, system design and energy consumption analysis. Codes and standards for building energy management, energy conservation. Heating and air-conditioning systems; central-control systems. Cost estimates. Prerequisite: ME 187 or equivalent. (Spring) Goulard and Staff
- 261 **Air Pollution I** (3)  
Introductory course on the generation, monitoring, and control of air pollution. Atmospheric pollutants; current levels and health problems. Combustion chemistry and mixing. Photochemical processes; smog and measurements. Atmospheric dispersion; inversion and acid rain. Prerequisite: approval of department. (Fall, odd years) Goulard and Staff
- 262 **Air Pollution II** (3)  
Trends in the design of nonpolluting automotive sources. Atmospheric pollution diffusion and long-term chemical evolution. Weather interaction. Diagnostic techniques and remote sensing. Air pollution standards. Noise control. Prerequisite: ME 261 or equivalent. (As arranged) Goulard and Staff
- 267 **Power Plant Pollution Control** (3)  
The control of emissions from stationary sources. Aerosol controls, sedimentation, precipitation, filtration, and wet collection. Application of scrubbers, catalysts, and combustion modification to control of gaseous emissions from stationary sources. Waste disposal. Future design concepts. Thermal pollution. Prerequisite: ME 261 or equivalent. (As arranged) Cutler and Staff
- \*269 **Wind Tunnel Research Techniques** (3)  
A comprehensive survey of wind tunnel research facilities and techniques. Subsonic, transonic, supersonic, and hypersonic facilities. Basic principles of wind tunnel design and associated research equipment. Data acquisition and reduction, research methods, static and dynamic testing techniques. Prerequisite: approval of department. (Spring) Whitesides and Staff
- 270 **Aerodynamics of Flight Vehicles** (3)  
Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: approval of department. (Spring) Whitesides and Staff
- \*271 **VTOL Aircraft Technology** (3)  
Fundamental principles of VTOL aircraft. Hovering performance based on momentum theory, analysis of jet-induced interference effects, transition aerodynamics, theoretical stability and control and correlation with flight data, effect theory and experiment, handling-qualities criteria. Prerequisite: approval of department. (Spring) Whitesides and Staff
- \*272 **Powered-Lift Technology** (3)  
Basic principles of powered-lift aircraft. High-lift aerodynamics, low-speed stability and control, fundamentals of internally blown and externally blown air.



ered-lift concepts, the spanwise blowing scheme to delay wing stall. Use of powered lift for improved maneuverability of fighter aircraft, aerodynamic ground effects. Prerequisite: approval of department. (Fall)

- \*273 **Principles of Automatic Flight Control** (3) Klein and Staff  
Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control, stability, accuracy, and speed of response; equalization effects of nonlinearities and noise. Prerequisite: approval of department. (Spring)

- \*274 **Principles of Flight Guidance** (3) Klein and Staff  
Guidance requirements for atmospheric flight. Implementation of guidance systems using inertial and radio techniques in conjunction with automatic data processing. Prerequisite: ME 273. (Fall)

- 275 **Stability and Control of Vehicles** (3) Klein and Staff  
Derivation of equations of motion. Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques, and frequency-response analysis. Prerequisite: approval of department. (Fall)

- 276 **Mechanics of Space Flight** (3) Walberg and Staff  
Two-body problems, including orbital elements, universal variables, orbit determination, Kepler's equations, orbit transfers, and Lambert's theorem. Orbital perturbation, variation of parameters, drag and oblateness effects. Prerequisite: EngS 217. (As arranged)

- 277 **Computational Fluid Dynamics** (3) Goulard, Whitesides, and Staff  
Theory of discrete methods for solving the governing equations of fluid dynamics. Potential flow, Euler equations, Navier-Stokes equations. Emphasis on algorithm development appropriate to modern supercomputers. Prerequisite: EngS 284, ME 221. (As arranged)

- \*279 **Special Topics in Flight Sciences** (3) Staff  
Prerequisite: approval of department.

- 280 **Intermediate Thermodynamics** (3) Kiper and Staff  
Macroscopic and microscopic descriptions of thermodynamic systems. Conditions of equilibrium and stability of thermodynamic systems. Review of methods of statistical thermodynamics. Properties of perfect gases and crystals. Review of elements of kinetic theory and transport phenomena. Selected applications. Prerequisite: approval of department. (Fall)

- 281 **Advanced Thermodynamics** (3) Kiper and Staff  
The concept of ensembles; Boltzmann, Fermi-Dirac, and Bose-Einstein statistics, balance and entropy-production equations. Linear and nonlinear, nonequilibrium thermodynamics. Benard instability and fluctuation theory. Integration of subjects using information theory, computational techniques. Prerequisite: ME 280 or equivalent. (Spring, even years)

- 283 **Nuclear Reactor Engineering I** (3) Kiper and Staff  
Nuclear fission and chain reaction, critical mass, Nuclear reactor classification, radiation detection, hazards, and protection. Neutron reactions. Reactor systems, transient reactor behavior and control. Environmental considerations, reactor safety. Prerequisite: approval of department. (As arranged)

- 284 **Nuclear Reactor Engineering II** (3) Kiper and Staff  
Reactor coolants; reactor thermal hydraulics, radiation damage. Reactor fuels, shielding, mechanical and structural components. Preliminary reactor design, fuel cycles, nuclear reactor systems, engineered safety systems. The economics of nuclear power. Prerequisite: ME 283. (As arranged)

- \*285 **Reaction Kinetics** (3) Staff  
Theoretical aspects of kinetics of homogeneous and heterogeneous reactions in gaseous and liquid systems. Prerequisite: ME 280. (As arranged)

- 286 **Special Topics in Mechanical Engineering** (3) Staff  
Prerequisite: approval of department. (As arranged)

- 287 **Heat Conduction** (3) Goulard and Staff  
Conduction of heat through solid, liquid, and gaseous media. Formulation and methods of analytical, numerical, and analog solutions. Steady two- and three-dimensional problems, problems in unsteady heat conduction. Conduction in composite regions. Prerequisite: ApSc 213 or equivalent. (Fall, odd years)

- 288 Convective Heat and Mass Transfer (3)** Goulard and Staff  
Heat and momentum transfer in laminar and turbulent flow. The laminar boundary-layer solution. Similarity and nondimensional parameters. Mass-momentum-heat transfer analogy. Convective heat transfer at high velocity. Stability, transition, and turbulence. Free convection. Prerequisite: ME 221 or equivalent (Spring, odd years)
- 289 Radiative Heat Transfer (3)** Goulard and Staff  
Thermal radiation; laws of intensity attenuation and generation. Solid angles and frequency spectrum. Surface properties and view factors: design of furnaces and radiant boilers. Optical temperature diagnostics; remote sensing. Prerequisite: approval of department. (Fall, even years)
- \*290 Kinetic Theory of Gases (3)** Cutler and Staff  
Equations and physical properties for gas composed of discrete particles; relation to thermodynamics; Maxwell distribution of molecular velocities. Boltzmann's theorem; molecular interactions, free paths, collision rates, scattering coefficients; introduction to diffusion, viscosity, heat conduction; imperfect gases; flow of gases at low density. Prerequisite: ME 280. (As arranged)
- 291-92 Power Systems (3-3)** Kiper and Staff  
Design of thermal power system components and system optimization. Heat balance studies, options for improved cycle efficiencies, component selection and design, safety and pollution regulations. Survey of electric power system technology. Prerequisite: ME 187 or equivalent. (Alternate academic years)
- 293 Combustion (3)** Garriss, Goulard, and Staff  
Basic combustion phenomena. Rate processes and chemical kinetics. Combustion reaction theory. Detonation, deflagration, diffusion flames, heterogeneous combustion. Experimental measurements. Impact of pollution regulations and alternate fuels. Prerequisite: approval of department. (Spring, even years)
- 295 Statistical Thermodynamics (3)** Kiper and Staff  
Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; partition functions; correspondence between classical and statistical thermodynamics. Systems with negligible effects of interparticle forces; perfect gases. The Debye solid, the Einstein solid. Prerequisite: ME 280. (As arranged)
- 296 Special Topics in Heat and Mass Transfer (3)** Goulard and Staff  
Prerequisite: approval of department. (As arranged)
- 297 Special Topics in Fluid Mechanics (3)** Staff  
Prerequisite: approval of department. (As arranged)
- 298 Research (arr.)** Staff  
Research as arranged. May be repeated for credit.
- 299-300 Thesis Research (3-3)** Goulard and Staff
- 310 Mechanics of Non-Newtonian Fluids (3)** Goulard and Staff  
Classification of fluids, physical properties of composite fluids, constitutive equations of composite fluids. Purely viscous fluids, Reiner and Rivlin theories, power-law fluids. Viscoplastic fluids. Drag reduction by polymeric additives. Prerequisite: approval of department. (As arranged)
- 311 Nonsteady Flow (3)** Garriss and Staff  
Fundamental equations of nonsteady viscous flow. Characteristics and wave propagation. Initial and boundary conditions. Piston theory and the oscillating airfoil. Nonsteady flows with entropy production. Gas dynamics of nonsteady combustion. Prerequisite: ME 235 or 237, or equivalent. (As arranged)
- 312 Theory of Turbulence (3)** Goulard and Staff  
Concept of turbulence, transition and linear theory of flow stability, experimental observations on turbulence generation, turbulent kinetic energy distribution, statistical description of turbulence, mean turbulent energy and Reynolds stress closure models, turbulent shear flows in free turbulence and wall turbulence. Prerequisite: ME 227. (As arranged)
- 313 Magnetofluidmechanics (3)** Staff  
Thermodynamics and fluid mechanics of electrically conducting liquids and gases, properties of plasmas. Dimensional analysis and scaling parameters. Magnetohydrodynamic power generators, pumps, plasma jets and propulsion, controlled thermonuclear fusion, chemical synthesis and mineral separation. Prerequisite: ME 221. (As arranged)



**315 Hypersonic Flow (3)**

Goulard and Staff

Shock waves in hypersonic limits, one-dimensional piston problem, and method of characteristics. Hypersonic small-disturbance theory. Unsteady and similarity parameters. Newtonian flow theory for slender and blunt bodies. Hypersonic viscous interaction phenomena. Prerequisite: ApSc 211, ME 235 (As arranged)

**317 Physical Gas Dynamics (3)**

Staff

Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235, 295, or equivalent. (As arranged)

**398 Advanced Reading and Research (arr.)**

Staff

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Staff

Limited to Doctor of Science candidates. May be repeated for credit.

**ENGINEERING SCIENCE**

Courses designated "As arranged" are not offered on a regular basis. An asterisk indicates that a course is offered at NASA-Langley Research Center and may be offered on campus when arranged.

**201 Introduction to Manufacturing (3)**

Staff

Fundamentals of modern manufacturing. Processes for manufacturing mechanical and electronic components from metals, polymers, ceramics, and silicon. Manufacturing systems, CAD, robotics, and design for assembly. Current capabilities, technological needs, and competitiveness. Examples from high-tech industries. Prerequisite: approval of department. (Fall)

**208 Energy Conservation (3)**

Goulard and Staff

Conservation methods in the home, in transportation, and in industrial manufacturing and commercial sectors. Second law of thermodynamics from a conservation viewpoint. Construction methods for low energy consumption in large and small edifices. Environmental effects. Prerequisite: approval of department. (As arranged)

**210 Quantitative Aspects of Social Phenomena (3)**

Staff

Mathematical models presenting social phenomena. Comparison of deterministic and stochastic analysis. Population growth, birth and death rates, population diffusion. Traffic flow, the statistical approach and Lighthill's method. Environmental modeling. Prerequisite: approval of department. (As arranged)

**212 Nonrenewable Resources (3)**

Staff

Nonrenewable fossil and fissile fuel resources. The interplay of geology, engineering applications, and economics. Exploration, excavation, production, and processing. Conversion techniques. Environmental impacts. Prerequisite: ME 257 or approval of department. (As arranged)

**213 Renewable Resources (3)**

Staff

Renewable energy resources. Solar energy aspects. Biomass. Biological and chemical processes. Solar photovoltaics, wind energy, ocean thermal energy conversion, tidal energy, geothermal energy. Central vs. distributed energy systems. Prerequisite: ME 257 and 258 are desirable, or approval of department. (As arranged)

**214 Geothermal Energy (3)**

Staff

Geothermal energy, geographic location of potential geothermal energy sources, methods of exploration and study of steam and hot rock systems. Generation of electricity from geothermal sources. Obtaining hot water process heat. Equipment design. Environmental effects. Prerequisite: approval of department. (As arranged)

**215 Advanced Strength of Materials (3)**

Staff

Deflection of beams using singular functions, unsymmetrical bending of beams, beams on elastic foundation. Beam-column problems, shear center for thin-walled beam cross sections, curved beams. Applications of energy methods, torsion, basic equations for theory of elasticity, thin- and thick-walled cylinders, stress concentration, and failure criteria. Prerequisite: CE 120. (Spring)

- 217 Analytical Mechanics (3)**  
Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, nonholonomic systems, Hamilton's equations, theory of small oscillations. Prerequisite: approval of department. (As arranged) Moyer and Staff
- 218 Introduction to Continuum Mechanics (3)**  
Kinematics of a continuum, equations of motion, linear isotropic elastic solid, Newtonian viscous fluid, integral formulation of general principles, simple applications. Prerequisite: approval of department. (Fall) Moyer and Staff
- 221 Theory of Elasticity I (3)**  
Review of basic concepts and equations, formulation of boundary-value problems, variational principles, general torsion and bending of prismatical rods, solution of plane problems using complex analysis. Prerequisite: ApSc 211, EngS 215 or 218. (Spring) Eftis and Staff
- 222 Theory of Elasticity II (3)**  
Three-dimensional elastostatics, thermoelasticity, and introduction to elastic wave propagation. Prerequisite: EngS 221. Prerequisite or concurrent registration ApSc 215. (Fall, odd years) Eftis and Staff
- 228 Physical Oceanography (3)**  
Seawater, equations of motion, interaction between air and sea, currents, water waves in deep and shallow waters, long ocean waves, tides, wave statistics, sea ice. Prerequisite: ME 221 or equivalent. (As arranged) Feir and Staff
- 229 Transformations in Materials (3)**  
Thermodynamics of solids, statistical interpretation of entropy, lattice defects, equilibrium in multicomponent systems, rate theory, diffusion, phase transformations, nucleation and growth, precipitation, martensitic transformations. Prerequisite: CE 140, ME 280. (Spring, odd years) Gilmore and Staff
- 230 Deformation of Materials (3)**  
Dislocation geometry, stress field of dislocations, forces on a dislocation, dislocation reactions, dislocation dynamics, yield, plastic flow, work hardening, recovery, solid solution hardening, precipitation and dispersion hardening. Prerequisite: CE 166, EngS 218. (Fall, odd years) Gilmore and Staff
- 231 Structure of Materials (3)**  
Introduction to bonding types, including covalent, metallic, and ionic. Crystallography, elastic properties of crystals, crystal defects, thermodynamics of solids, crystal defect interactions, solid solutions, intermediate composition defect clusters, grain boundaries, phase boundaries, and surfaces. Modern techniques for solids. Prerequisite: CE 140. (Fall) Gilmore and Staff
- 233 Mechanics of Composite Materials (3)**  
Stress-strain relationship for orthotropic materials, invariant properties of an orthotropic lamina, biaxial strength theory for an orthotropic lamina, Mechanics of materials approach to stiffness, elasticity approach to stiffness, Classical lamination theory, strength of laminates. Statistical theory of fatigue damage. Prerequisite: approval of department. (Spring, odd years) Gilmore and Staff
- 234 Composite Materials (3)**  
Principles of composites and composite reinforcement. Micromechanics of failure, interface reactions in various composites, reinforcing materials, Structure of composites: fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of department. (Spring, even years) Gilmore and Staff
- 236 Experimental Techniques in Materials Science (3)**  
Sample preparation. Optical microscopy. X-ray diffraction. Electron microscopy. Field emission microscopy. Scanning and transmission electron microscopy. Prerequisite: CE 140. (Spring, odd years) Gilmore and Staff
- 237 Environmental Effects on Materials (3)**  
Aqueous corrosion, electrochemistry, electrochemical reactions, polarization, Environmental factors, intergranular corrosion, stress corrosion, high temperature corrosion, kinetics and mechanisms of corrosion, oxidation, liquid metal corrosion, irradiation effects. Prerequisite: approval of department. (Spring, even years) Gilmore and Staff
- \*239 Physical Ceramics (3)**  
Crystal chemistry and the structure of ceramic materials. Solid reactions at elevated temperatures. Sintering vitrification, diffusional mechanisms and defects. Reaction rate theory. Elastic, anelastic, and plastic properties of ceramics. (Spring, even years) Gilmore and Staff



covalent solids. Viscoelastic behavior of vitreous and vitreous-solid systems. Phase equilibria. Prerequisite: approval of department. (As arranged)

- 240 Fracture Mechanics (3)** Jones and Staff  
Fundamentals of brittle fracture. Griffith theory and extensions, mechanics of fracture. Linear elastic systems, plasticity considerations, fracture toughness. Engineering analysis, notch-strength analysis with limit approach, crack-propagation laws, fatigue, fracture testing. Prerequisite: EngS 221 or CE 261. (Spring, even years)

- 241 Failure of Materials (3)** Gilmore and Staff  
Tensile and shear deformation, yield, dislocation motion, twinning creep, polymer deformation, fracture, microstructure effects, stress corrosion cracking, cyclic stress and strain, fatigue, statistical analysis, failure analysis. Prerequisite: CE 166. (Fall, odd years)

- 242 Materials Recycling and Recovery (3)** Gilmore, Lamb, and Staff  
Techniques and technologies for recovering and reusing waste materials. Relationships of recycling and waste reduction to energy conservation and environmental impact, legal, economic, institutional, and environmental policy aspects of recycling and waste reduction. Prerequisite: approval of department. (As arranged)

- 249 Special Topics in Materials Science (3)** Gilmore and Staff  
Prerequisite: approval of department. (As arranged)

- 256 Plasticity (3)** Moyer and Staff  
Introduction to the continuum theory of plastic deformation. Physical basis of rate-independent plasticity. Concepts of yield, strain hardening and softening, reverse yield, and cyclic plasticity. Constitutive equations describing plastic deformation. Prerequisite: EngS 215 or 218. (Spring, odd years)

- 257 Theory of Vibrations (3)** Toridis and Staff  
Damped and undamped natural vibration, response of single- and multiple-degrees-of-freedom systems to steady-state and transient excitations, modal analysis, nonproportional damping and complex modes, variation formulation of equations of motion, discretization of structural systems for vibrational analysis. Prerequisite: approval of department. (Fall)

- 258 Structural Dynamics (3)** Staff  
Vibration of continuous systems: membranes, beam plates, and shells; approximate methods of vibration analysis, methods of integral transform, analysis of nonlinear systems, wave propagation. Prerequisite: EngS 257 or approval of department. (Fall, odd years)

- 259 Random Vibration of Structures (3)** Staff  
Introduction to random processes, responses of linear structures to stationary and nonstationary random inputs. Structural responses to earthquakes, waves, boundary-layer turbulences, wind loads, etc. Failure analysis of structures under random loads. Prerequisite: ApSc 115 or CE 258. Prerequisite or concurrent registration: EngS 257. (Spring, even years)

- 260 Random Process Theory in Engineering (3)** Staff  
Spectral analysis, linear system, the superposition principle. Statistical prediction and probability function, Rayleigh distribution and its properties, threshold crossing problems, prediction of extreme values. Statistical prediction of random vibration, application to civil and mechanical engineering. Prerequisite: ApSc 115 or equivalent. (Fall)

- 270 Theoretical Acoustics I (3)** Myers and Staff  
Basic acoustic theory in stationary and uniformly moving media; waves in infinite space, sound transmission through interfaces; sound radiation from simple solid boundaries, source and dipole fields; propagation in ducts and enclosures; elements of classical absorption of sound. Prerequisite: ApSc 213, ME 221. (As arranged)

- 271 Random Process Theory II (3)** Staff  
Random processes; stationarity and ergodicity; mean-square calculus; auto- and cross-correlations and spectra; random processes in linear systems; mean-square estimation, prediction, and filtering; zero and level crossings and peak distributions; applications in aerospace sciences. Prerequisite: approval of department. (As arranged)

**272 Random Process Theory II (3)**

Discrete and continuous state Markov processes; chains, queues, diffusion, and passage problems; linear and nonlinear estimation and stochastic control; estimation of correlations and power spectra; applications in engineering problems; scattering from random surfaces; stochastic linearization and stability. Prerequisite: EngS 259 or 260 or 271. (As arranged)

**\*273 Time Series Analysis (3)**

Harmonic analysis of random signals; auto- and cross-correlations and spectral coherence; modern techniques for spectral estimation, including fast Fourier transform, maximum entropy, and maximum likelihood, bias and variability of randomly sampled data; digital filtering; applications. Prerequisite: EngS 271 or approval of department. (As arranged)

**274 Environmental Noise Control (3)**

Introduction to the physical effects of noise and vibration on humans, practical sources of noise and their control. Building, ventilation-system, mechanical-equipment, aircraft, automobile, and truck noise. Factors affecting vibration levels and vibration control by structural design, damping, and isolation. Prerequisite: EngS 270, ME 215. (As arranged)

**\*275 Theoretical Acoustics II (3)**

General theory of sound propagation in homogeneous media, viscous and heat conduction effects; inhomogeneous wave equation; sound radiation; sources: dipoles, quadrupoles; radiation from moving sources; scattering and diffraction of sound by obstacles; acoustics of inhomogeneous media, geometric acoustics. Prerequisite: EngS 270. (As arranged)

**\*276 Acoustical and Mechanical Measurements (3)**

Characteristics of signals, basic transducer elements, standards of measurements and calibrations, signal recording and processing, acoustical and vibration instrumentation, vibration exciters, vibration testing techniques, flow mechanical measurements. Prerequisite: EngS 270, ME 215. (As arranged)

**\*277 Physical Acoustics (3)**

Concepts of continuum mechanics and thermodynamics, wave propagation in real media, thermal viscous and relaxational attenuations, piezoelectric crystals and ultrasonics, wave propagation in rigid and deformable porous media. Prerequisite: EngS 275. (As arranged)

**\*278 Psychological and Physiological Acoustics (3)**

Auditory system and its response to sound, experimental methodology in psychoacoustics, subjective response to sound, environmental noise and its evaluation, criteria for the prediction of noise nuisance, nonauditory system responses to noise. Prerequisite: approval of department. (As arranged)

**\*279 Human Factors in Engineering (3)**

Human-machine interface, effects of physical stress on human behavior and performance, life-support system, learning and conditioning of physical stress. (As arranged)

**\*280 Special Topics in Acoustics (3)**

Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of department. (As arranged)

**\*281 Advanced Programming Techniques for Engineering Problems (3)**

Techniques for efficient construction of engineering software systems with emphasis on fundamental structured programming principles. Effects of computer architecture and other hardware features on numerical computations. Organization and management of large engineering databases. Use of advanced visualization techniques. Prerequisite: approval of department. (As arranged)

**282 Computer-Aided Design (3)**

Fundamental concepts in the development of computational algorithms for the design of structures, machine components and assemblies, and other engineering systems. Representation of the design process and design specifications in a network of decision tables and logical flags. Optimization techniques and algorithms in design applications. Prerequisite: CSci 50, CE 210. (Fall)

**283 Application of Computer Graphics in Engineering (3)**

Automatic generation and display on CRT screen of geometrical shapes and plotting of a grid of discrete points interconnected by user-selected geometric shapes.



Automatic mesh generation, transformations, projections, and the concept of "hidden" lines. Interactive computer-graphics applications. Prerequisite: CSci 51 or equivalent; or concurrent registration: EngS 284. (Spring) Staff

**284 Numerical Methods in Engineering (3)**

Eigenvalue problems. Numerical solution of systems of equations and ordinary differential equations. Solution techniques for elliptic, parabolic, and hyperbolic partial differential equations. Numerical methods for solving finite element equations. Introduction to solution of fluid-flow problems. Prerequisite: CE 117 or ME 117, or approval of department. (Fall) Moyer and Staff

**285 Finite Element Methods in Engineering Mechanics (3)**

Calculus of variations. Variational formulation of the finite element method. Weighted residual techniques. Computer implementation of the finite element method. Application to problems in heat transfer, stress analysis, fluid flow, and structural analysis. Prerequisite: approval of department. (Spring) Staff

**286 Analysis and Design of Thin-Walled Structures (3)**

Statics of thin-walled beams and panels, force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures. Strength and stiffness of locally buckled stiffened structures. Design considerations. Critical evaluation of various design procedures. Prerequisite: approval of department. (As arranged)

**287 Automated Design of Complex Structures (3)**

Review of techniques for automated design, including mathematical programming, fully stressed design, and optimality criteria. Application of automated design techniques to stiffened and composite shell-type structures. Multiple-load conditions and design constraints. Prerequisite: approval of department. (As arranged) Staff

**288 Advanced Finite Element Methods in Structural Mechanics (3)**

Review of variational formulation of the finite element method. Formulation of various continuum and structural elements. Application to static and dynamic problems in elasticity, plasticity, large deflection, and instability in plates and shells. Recent developments in finite element methods. Prerequisite: CE 210, EngS 285. (As arranged) Toridis and Staff

**289 Special Topics in Theoretical and Applied Mechanics (3)**

Eftis and Staff

**298 Research (arr)**

Basic research projects as arranged. May be repeated for credit. Staff

**299-300 Thesis Research (3-3)**

**310 Aeroacoustics (3)**

General theory of aerodynamic sound generation and propagation. Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary-layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: EngS 275. (As arranged) Staff

**311 Nonlinear Acoustics (3)**

Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of department. (As arranged) Staff

**312 Theory of Random Vibration (3)**

Response of linear systems to stationary random inputs. Failures resulting from dynamic response. Response of space vehicle structures to intense noise fields, measurement, and application. Prerequisite: EngS 271, ME 215. (As arranged) Staff

**313 Structural Acoustic Interaction (3)**

Coupled response of structures to sound, system of infinite extent, system of finite extent, sound radiation from structure, sound transmission through structure. Panel response to turbulent boundary-layer excitation. Sound radiation from mechanically excited structure vibration. Prerequisite: EngS 270, 312. (As arranged) Staff

**314 Advanced Numerical Methods (3)**

Finite difference, finite element, and spectral methods for elliptic, parabolic, and hyperbolic differential-equation systems. Parallel- and array-processing techniques. Nonlinear equations. Prerequisite: ApSc 213, EngS 284. (As arranged) Staff

- 315 **Introduction to Nonlinear Mechanics of Continua** (3) Eftis and Staff  
Polar decomposition, invariance, isotropy, representation theorems for invariants and isotropic tensor functions. Deformation, kinematics, stress, balance principles. Principles for constitutive relations. Applications to nonlinear elasticity and non-Newtonian fluids. Prerequisite: ApSc 212 (Spring, even years)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## COMPUTER AND INFORMATION SYSTEMS

See Statistics/Computer and Information Systems.

## COMPUTER SCIENCE

See Electrical Engineering and Computer Science.

## COUNSELING

See Human Services.

## CRIME IN COMMERCE

See Forensic Sciences.

## CRIMINAL JUSTICE

See Forensic Sciences.

## DANCE

See Theatre and Dance.

## DRAMA

See Theatre and Dance.

## EAST ASIAN LANGUAGES AND LITERATURES

### CHINESE

- 271-72 **Poetry of the Tang and Song Periods** (3-3) Chinese Staff  
Reading of works of leading poets. Discussion of content and style. Prerequisite: Chin 109 or equivalent. (Alternate academic years)
- 273 **Yuan Drama** (3) Staff  
Readings of plays by Guan Han-qing, Ma Zhi-yuan, and others. Prerequisite: Chin 109 or equivalent.
- 277-78 **Prose Narratives of the Song, Ming, and Qing Periods** (3-3) Staff  
Short stories of the Song period. Selected readings of Ming/Qing novels. Historical development and stylistic traits. Prerequisite: Chin 107 or equivalent. (Alternate academic years)
- 299-300 **Thesis Research** (3-3)

### EAST ASIAN STUDIES

**Program Committee:** W.R. Johnson (Director), H.C. Hinton, Y.C. Kim, C.W. Shih, G. R. Thornton, R.Y. Yin

The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of East Asian studies



**Master of Arts in the field of East Asian studies**—Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School.

The program is available in a 30-semester-hour option with a thesis or a 36-semester-hour option without a thesis. Students electing the nonthesis option must prepare a substantial research paper in a two-semester readings research course. (In the concentration in Chinese language and literature, only the thesis option is available.) Students with no previous course work in the modern history and politics of China and Japan may need to take additional courses beyond the minimum required for the degree to acquire this background. A reading knowledge of Chinese, Japanese, or another approved East Asian language must be demonstrated. Credit for language study is not counted toward degree requirements.

Students must complete course work related to East Asia in at least four of the following Departments: East Asian Languages and Literatures, Economics, Geography and Regional Science, History, and Political Science. (Those who choose the concentration in Chinese language and literature are excepted.)

Students in the thesis program must pass Master's Comprehensive Examinations in two fields: one in a major field (12 credit hours) and one in a minor field (6 credit hours). Students in the nonthesis program must pass the Examinations in three fields if they select one major field and two minor fields and in two fields if they select two major fields. Concentration in Chinese language and literature—only the thesis option is available. Students must take 12 credit hours of Chinese literature and pass a Master's Comprehensive Examination in this major field. They must also take 6 hours of history courses and 6 hours of additional courses that pertain to East Asian studies and must pass a Master's Comprehensive Examination in one of these two minor fields.

The following graduate courses pertain to East Asian studies

Chin 271-72	Poetry of the Tang and Song Periods
Chin 273	Yuan Drama
Chin 277-78	Prose Narratives of the Song, Ming, and Qing Periods
Econ 269-70	Economy of the People's Republic of China
Econ 271	Economy of Japan
Geog 266	Seminar: Geographic Perspectives on Contemporary China
Hist 253-54	Readings Seminar: History of Sino-Soviet Relations
Hist 255-56	Readings Seminar: U.S.-Soviet Strategic Relations Since World War II
Hist 259-60	Research Seminar: Problems in U.S.-Soviet-Chinese Relations
Hist 289	Readings/Research Seminar: Modern Japanese History
Hist 293	Research Seminar: Modern East Asian History
Hist 295-96	Readings Seminar: Modern Chinese History
IAff 291	Colloquium: East Asia
PSc 270-71	Politics of the People's Republic of China
PSc 272	Foreign Policy of the People's Republic of China
PSc 275	International Politics of the Far East
PSc 276	Governments and Politics of Japan and Korea

## ECONOMICS

Professors J. W. Kendrick (Emeritus), C.T. Stewart, Jr., I. Aschheim, H. Solomon, S. Levitan (Emeritus), C.Y. Hsieh (Emeritus), J.I. Gastwirth, M.A. Holman, R.M. Dunn, Jr., W.F.E. Long (Emeritus), S.E. Haber, R.S. Goldfarb, O. Havrylyshyn, A.M. Yezzer, J.J. Cordes, J. Pezman, J.E. Kwoka, R.P. Trost, B.L. Boulier (Chair), G. Brock  
 Associate Professors T.F. Carroll, P. Swamy, J. Hardt, E.H. Solomon, D.J. Rousslang, K. Flamm  
 Associate Professors R.Y. Yin, H.S. Watson, M.D. Bradley, S.C. Smith, A. Klammer  
 Adjunct Associate Professor M.A. Bailly  
 Assistant Professorial Lecturer S.N. Kirby  
 Assistant Professors V. Fon, M.-H. Ye, R.F. Phillips, F.L. Joutz, M.O. Moore, S.M. Suranovic, H. Courtney, B. Drees, N. Vonortim

**Master of Arts in the field of economics**—Prerequisite: (1) a Bachelor of Arts degree with concentration in economics or with course work in economics that includes intermediate economic and macroeconomic theory (equivalent to Econ 101, 102 or 217-18); (2) an understanding of basic calculus, equivalent to Math 31-32 or 41-42. Applications are due for the fall semester only.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences, including (1) Econ 203-4, 205, and 275, (2) 12 additional credit hours to be selected from other third-group economics courses; (3) a Master's Comprehensive Examination in economic theory; and (4) either a thesis (Econ 299-300) or 12 credit hours selected from additional third-group economics courses. In some cases, up to 6 credit hours in courses outside the Department may be substituted for certain of the above requirements when it is deemed clearly important to the candidate's area of study.

**Doctor of Philosophy in the field of economics—**The Ph.D. program involves study in two sequential units. Unit I includes satisfactory completion of required course work, and passing the General Examination. This first unit must be concluded within five years after entry into the program. Upon successful completion of Unit I, students are considered for admission to Unit II, the dissertation stage, which must be completed within five years after entry. In all cases, however, the student is expected to complete the doctorate within eight years after admission. Students admitted to the second unit will be recommended by the Department of Economics for the Master of Philosophy degree.

Students must meet the general requirements stated under the Graduate School of Arts and Sciences. For Unit I, the requirements include Econ 202, 203, 204, 205, 206, 215, 216, and 275, plus 24 additional credit hours of approved graduate course work, and passing the General Examination in microeconomic theory, macroeconomic theory, and two other fields selected by the student and approved by the doctoral program committee. Examinations are given in the following fields: econometrics, economic development, environmental and natural resource economics, health economics, history of economic thought, industrial organization, international economics, labor economics, monetary theory and policy, public finance, regional and urban economics, and Soviet and East European economics.

**Examinations:** the field examinations that constitute the General Examination are given at least two times per year. The requirements for the microeconomic and macroeconomic theory examinations must be met before any other field examinations may be taken. Students are strongly advised to take the microeconomic and macroeconomic theory examinations within two years of entering the program. To pass the General Examination, students must earn a grade of "satisfactory pass" or better in the field examinations in microeconomic or macroeconomic theory and in one of the other two field examinations, and no grade below "bare pass." Two of the field examinations may be taken a second time with the approval of the department and the dean. No further opportunity to take the examinations is permitted. Substitution of a field examination (in an area not originally chosen by the student) to satisfy the requirements of the General Examination is equivalent to taking a field examination a second time. Students should consult with the professor responsible for their fields and notify the department two months in advance of their intention to take the examinations. If such notification is not given sufficiently in advance, it may not be possible to sit for the examination.

For Unit II, the requirements include formulation of an acceptable dissertation proposal, completion of a dissertation that demonstrates the candidate's ability to do original research, and 24 hours of additional graduate course work, of which at least 12 hours must be dissertation research. Students, including those who have an accepted dissertation proposal, must enroll in a dissertation proposal seminar (Econ 397) in the first semester after promotion to Unit II. Satisfactory performance in the seminar will be equivalent to 3 credit hours of Unit II course work. In cases where knowledge outside the discipline of economics is critical to the student's research field, up to 6 credit hours in Unit II may consist of required courses outside the Economics Department.

**Departmental prerequisite:** Graduate courses in economics (except 214, 217-18, 221-22, 243, 247, 249, 283, 284) are designed for graduate students in economics. Graduate students in other disciplines may register for third-group courses after having completed Econ 217-18 or 101 and 102, unless the course description indicates that these prerequisites have been waived. Intermediate-level micro and macro courses taken elsewhere usually satisfy this requirement, but introductory or first-year courses do not. In addition to these prerequisites and any others specific to the particular course, calculus is required in some sections of graduate economics courses.

Courses at the 300 level are offered as the demand warrants and may be repeated for credit.



- 202 History of Economic Thought (3)**  
Critical analysis and interpretation of the development of economic theory from Plato through the formulation of the Neoclassical Synthesis paradigm and contemporary revisions of the Neoclassical Synthesis. (Fall)  
Klamer
- 203-4 Microeconomic Theory (3-3)**  
Econ 203: Demand, production, cost theory. Prerequisite: Econ 101 or equivalent.  
Econ 204: Market structure, welfare, general equilibrium. Prerequisite: Econ 203. (Academic year)  
Fon, Ye
- 205 Macroeconomic Theory I (3)**  
Alternative theories of income, employment, and the price level; fiscal and monetary policy impacts; the role of expectations in the economy. (Fall)  
Bradley
- 206 Macroeconomic Theory II (3)**  
Continuation of Econ 205. Extensions of alternative models of income determination; application of analytic frameworks to the U.S. economy, examination of uncertainty and policy strategy. (Spring)  
Bradley
- 208 National Income, Product, and Productivity (3)**  
Output, input, and productivity relationships by industry; income, outlay, flow-of-funds, and balance sheets by sector; uses of accounts for analysis and projections. (Fall)  
Kendrick
- 214 Survey of Mathematical Economics (3)**  
Primarily for graduate students in fields other than economics. Students in economics should consult the instructor before taking this course. Differentiation, partial differentiation, and economic optimization problems; comparative statics; input-output analysis; difference, differential equations, and economic applications. Prerequisite: one semester of calculus and Econ 217-18.  
Fon
- 215-16 Mathematical Economics (3-3)**  
Formulation and application of mathematical models in economic theory. Prerequisite: a one-year calculus sequence. Open to undergraduates with permission of instructor. (Academic year)  
Fon
- 217-18 Survey of Economics (3-3)**  
Intermediate-level microeconomic theory (Econ 217) and intermediate-level macroeconomic theory (Econ 218) for graduate students in fields other than economics. (Econ 217 and 218—fall and spring)  
Goldfarb, Haber, Holman, Watson
- 221-22 Applied Economics (3-3)**  
An extension of microeconomic welfare analysis to the study of contemporary policy issues. Resource allocation decisions in the public sector, models of individual choice making in policy analysis, and policy aspects of production, cost, and organizational decision making. Primarily intended for students in fields other than economics. Prerequisite: Econ 217. (Academic year)  
Staff
- 223-24 Monetary Theory and Policy (3-3)**  
Theory of monetary policy within the framework of contemporary American central banking. (Academic year)  
Aschheim
- 233 Urban and Rural Development Policies (3)**  
Same as UPRE 242. Review of urban and rural development strategies in the LDCs. Theories and experiences of land reform, peasant cooperatives, small-farm technology, rural-urban linkages, and planning a service network. (Fall)  
Carroll
- 237 Economics of the Environment and Natural Resources (3)**  
Analysis of public policy problems relating to the environment and natural resources development and management. (Spring)  
Holman
- 239 Economics of Defense (3)**  
Economic analysis applied to national security planning and objectives. Analysis of defense establishment problems, including manpower, the defense industry base, procurement policy. (Spring)  
H. Solomon
- 241-42 Labor Economics (3-3)**  
Theory of wages and employment, analysis of labor supply and demand. Analysis of unemployment, unions, wage regulation. Econ 241 is prerequisite to Econ 242. (Academic year)  
Goldfarb
- 245-46 Industrial Organization (3-3)**  
Econ 245: Economic theory and evidence regarding industrial market structure, conduct, and economic performance. Econ 246: Economic issues in antitrust and government regulation of the U.S. economy. Econ 245 is prerequisite to Econ 246. (Academic year)  
Kwoka

- 247 Seminar: Industrial Organization (3)**  
Selected topics in regulatory and antitrust economics. Prerequisite: Econ 101, 217, or equivalent. Offered off campus only. (Spring)
- 248 Health Economics (3)**  
Demand for medical care, organization of the health care delivery industry, policy issues on regulation, efficiency, and allocation of health care services. (Spring)
- 249 Industrial Organization—The Telecommunication Industry (3)**  
Principles of industrial organization, welfare economics, and theories of regulation, in principle and in practice. Market power, merger analysis, vertical relationships, entry, and regulation of price and lines of business. The study of market performance and business practices of the telecommunication industry. Prerequisite: Econ 217. Offered off campus only.
- 251 Economic Development Theories (3)**  
Basic theories of economic growth and development. Issues covered may include measurement of economic growth; industrialization of agrarian economies; income distribution, employment, and poverty; international trade policies; debt problems of developing countries. (Fall and spring)
- 252 Economic Development Planning (3)**  
Theories and techniques of development planning and the experience in developing countries. Emphasis on tools of planning, particularly macro models, multisector models (including input-output, social accounting, linear programming, and computable general equilibrium models), and cost-benefit analysis and project appraisal. (Fall and spring)
- 255 Economics of Technological Change (3)**  
Economics of research and development; innovation and growth; the role of government in the development and use of new technology. (Spring)
- 257 Regional Economics (3)**  
Study of regional planning and growth models, including input-output, programming, and econometric models used by planning agencies; analysis of interregional production, trade, migration, firm location, and pricing models. (Fall)
- 258 Urban Economics (3)**  
Analysis of spatial relationships among economic activities within an urban area including the urban land, labor, and housing markets; urban transportation models; fiscal relationships among jurisdictions. Prerequisite: Econ 257 or permission of instructor. (Spring)
- 259 Income Distribution (3)**  
Theoretical and empirical analysis of income distribution; the sources of income inequality; evaluation of redistribution policies and their consequences. (Spring)
- 263 Theory of Public Finance I (3)**  
Allocation and distribution aspects of government budget policy, including critical analysis of expenditure theories and principles, and intergovernmental fiscal relations. (Fall)
- 264 Theory of Public Finance II (3)**  
Analysis of the effects of taxation on resource allocation and income distribution; impact of the public debt. (Spring)
- 267 Seminar: Soviet Economy (3)**  
An analysis of the Soviet economy. Issues discussed include growth, investment and price policy, and foreign trade and aid strategy. Admission by permission of instructor. (Fall)
- 268 Seminar: Economic Theory and Development in Communist Countries (3)**  
An analysis of the application of Soviet-type growth models to Eastern Europe and the resulting reforms. Admission by permission of instructor.
- 269 Economy of the People's Republic of China I (3)**  
Analysis of organization, operation, policies, and problems. Development of the economy since 1949. (Fall)
- 270 Economy of the People's Republic of China II (3)**  
Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring)



- 271 Economy of Japan (3)** Staff  
Analysis of Japanese economic institutions and their contribution to Japan's development. (Fall)
- 275 Econometrics I: Introduction (3)** Trost, Phillips  
Single-equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Topics include heteroscedasticity, serial correlation, and lagged dependent variables. Prerequisite: Econ 123. Some exposure to matrix algebra is helpful, but not required. Same as Stat 275. (Fall and spring)
- 276 Econometrics II: Simultaneous-Equation Models (3)** Trost, Phillips  
Simultaneous-equation models of economic behavior. Optional topics are maximum-likelihood estimation, limited dependent variables, and quantum-response models. Prerequisite: Econ 275. Recommended: a course in matrix algebra. Same as Stat 276. (Spring)
- 277 Laboratory in Applied Econometrics (3)** Trost  
Application of econometric theory. Use of econometric software. Each student will be required to write an empirical research paper. Prerequisite: Econ 275 or, with the permission of the instructor, Econ 123.
- 281 International Trade Theory and International Finance I (3)** Moore, Pelzman, Suranovic  
International trade theory, including alternative models of the gains from trade and evaluations of the new justifications for protectionism, and analysis of commercial policy, factor flows, and trade and investment with multinational corporations. Prerequisite: some sections may require calculus or permission of instructor. (Fall)
- 282 International Trade Theory and International Finance II (3)** Dunn, Pelzman  
International finance, including alternative models of balance of payments behavior and adjustment, payments accounting, exchange markets, and alternative exchange-rate regimes. (Spring)
- 283 Survey of International Economics and Policy I (3)** Dunn, Moore  
For graduate students in fields other than economics. Survey of international economics and policy; application of comparative advantage and other arguments for trade; impact of trade on a domestic economy; new arguments for protectionism, regional trading blocs. (Fall and spring)
- 284 Survey of International Economics and Policy II (3)** Dunn, Moore  
For graduate students in fields other than economics. International finance; balance of payments accounting, exchange markets, alternative models of balance of payments determination and adjustment, behavior of flexible exchange rate systems. (Fall and spring)
- 285-86 Economic Development of Latin America (3-3)** Flamm  
Econ 285: Diversity of structures of Latin American economies; import substituting industrialization; inflation; problems of underemployment and income distribution. Econ 286: Structure of trade: protection, exports, and economic development; regional and global economic integration, foreign investment, multinational enterprise, and technology transfer. (Academic year)
- 290 Principles of Demography (3)** Boulier  
Introduction to basic demographic perspectives and data; methods for analysis of population size, distribution, and composition; determinants and consequences of population trends. Departmental prerequisite waived. Same as Geog Soc Stat 290. (Fall)
- 291 Methods of Demographic Analysis (3)** Boulier  
Basic methods for analysis of mortality, natality, and migration, population estimates and projections, estimation of demographic measures from incomplete data. Departmental prerequisite waived. Same as Geog Soc Stat 291. (Spring)
- 295 Special Topics in Economics (3)** Staff  
Topics vary, depending on current issues of interest and faculty availability. (Fall and spring)
- 298 Reading and Research (3)**  
Limited to master's degree candidates.
- 300 Thesis Research (3-3)**
- 305 Seminar: Macroeconomics (3)** Bradley  
Selected topics in macroeconomics. Prerequisite: Econ 205.

- 310 **Economic Methodology** (3) Goldfarb, Stewart  
Methodology of economics, review of selected theoretical issues in economic theory. Prerequisite: six credit hours of graduate courses in economic theory.
- 312 **Seminar: Price Theory** (3)  
Selected topics in price theory.
- 315 **Seminar: Topics in Mathematical Economics** (3) H. Solomon, Pon, Y  
Intensive study of selected topics, including economic activity analysis, risk and uncertainty, and other topics of current interest. Prerequisite: Econ 215-16.
- 321 **Seminar: Monetary Theory** (3) Aschheim, Brad  
Recent developments in monetary theory.
- 341 **Seminar: Labor Economics** (3) Goldfarb  
Current problems in theory and policy.
- 345 **Seminar: Industrial Organization** (3) Kwoka  
Review of recent literature and current policy issues. Admission by permission of instructor.
- 348 **Topics in Health Economics** (3) Staff  
Advanced topics in health economics. Prerequisite: Econ 248 or permission of instructor.
- 351 **Seminar: Economic Development** (3) Havrylyshyn, Smith  
Analysis and review of recent theoretical work and/or selected topics of current policy interest. Prerequisite: Econ 251 and 252 or permission of instructor.
- 363 **Seminar: Public Finance** (3) Cordes, Watson  
Selected topics of current interest.
- 367 **Seminar: Soviet Planning in Theory and Practice** (3) Pelzman  
Analysis and review of recent work on planning theory as applied to the Soviet Union. Marxist ideology with modification is taken as the primary force shaping the objective function of Soviet planners. Soviet economic performance is evaluated based on this criterion. Prerequisite: Econ 203-4 and 267 or permission of instructor.
- 390 **Seminar: International Economic Theory** (3) Dunn, Pelzman  
Primarily for doctoral students. Examination of recent contributions in this field.
- 391 **Seminar: International Economic Policy** (3) Staff  
Topics selected from current significant policy problems.
- 397 **Dissertation Proposal Seminar** (3) Staff  
Limited to Doctor of Philosophy candidates in Unit II. Critical analysis of current research. Formulation of a dissertation proposal and development of dissertation research strategies.
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

#### EDUCATIONAL LEADERSHIP

Professors M.N. Rashid, J.C. Boswell, D.A. Moore, S.R. Paratore, R. Ferrante, E.J. Gleason (Visiting), M.A. Burns, G.W. Smith (Chair), J.A. Greenberg, J.D. Fife, D.H. Holmes, Leonard, M. Worth, B. Wolfman

Adjunct Professors R.C. Rist, C. Gerhard, D. Iwamoto, H. Torabi

Associate Professors D.M. Saunders, W.F. Lynch, J. McDonald

Assistant Professors H. Willett (Visiting), C.B. Stapp

Adjunct Assistant Professor D. Niles

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education.

Departmental prerequisite: A degree from an accredited institution is prerequisite to 200-level courses. With permission of the instructor, undergraduate students in their senior year may enroll in 200-level courses.

#### 201-2 International Education (3-3)

A study of a selected sample of foreign education systems as they reflect cultural history, values, people, and current changes. Research techniques to develop a



global frame of reference. International resources and resources unique to the Washington area are utilized. (Summer)

- 203-4 **Comparative Education** (3-3) Moore and Staff  
A systematic investigation of the educational structure and practices of selected representative school systems throughout the world. Emphasis on development of a methodology for comparative study. (Academic year)

- 205 **International Experiences** (1 to 6) Staff  
Travel to a foreign country for specific study and research. Admission by permission of the instructor.

- 206 **American Education: Introduction and Overview for International Students** (3) Moore  
The nature and organization of American education in a social, historical, and philosophical context, understanding contemporary change and how it is reflected in the education system.

- 207 **Instructional Materials, Media, and Resources** (3 to 6) Staff  
Review of technological contributions to education. Examination of current and emerging developments. Framework for study of selection, utilization, integration, and evaluation of audiovisual media in the teaching learning process. (Summer)

- 208 **Human Development** (3) Rashid  
Consideration of human development and behavior throughout the life span; emphasis on practical implications of relevant interdisciplinary research. (Fall and summer)

- 209 **Child Development** (3) Rashid  
Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood. (Fall)

- 210 **Adolescent Development** (3) Rashid  
Interdisciplinary approach to adolescent development and behavior. Practical implications of research in disciplines contributing to knowledge about adolescence. (Spring)

- 212 **Quantitative Methods I: Introduction to Survey Measurement and Research** (3) Staff  
Introduction to measurement techniques and evaluation. Emphasis on application and interpretation of data-gathering techniques and descriptive statistics. (Fall, spring, and summer)

- 213-14 **Western Educational Thought** (3-3) Boswell  
Following the themes of certainty, equality, and progress, this course examines the ideas of selected philosophers in their historical context and relates them to education. Educ 213: From Sumer to the Enlightenment; Educ 214: From the Enlightenment to the present with concentration on the American experience. (Fall and spring)

- 216 **Advanced Study of the History of Education** (3) Boswell  
Individually planned program of study on topic of student's interest. Prerequisite: Educ 213-14 or the equivalent.

- 217 **Advanced Study of the Philosophy of Education** (3) Boswell  
Individually planned program of study on topic of student's interest. Prerequisite: Educ 213-14 or the equivalent.

- 218 **Social Foundations of Education** (3) Boswell  
The relationship between school and society; social, economic, and political purposes of schooling as well as forces that shape policies and school curricula. Contemporary issues and their implications for the future.

- 220 **Experimental Course in Education and Human Development** (arr.) Staff  
Topic to be announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

- 222 **Museum Studies** (3) Stapp  
Study of the museum's functions and its educational roles. Admission by permission of instructor. (Summer)

- 223 **Museum Audiences** (3) Staff  
Study of diverse audiences of many ages who use and enjoy museums; appropriate museum and outreach practices. Admission by permission of instructor. (Fall)

**224 Communication Skills (3)**

Theory of and practice in the development of communication skills in the museum. Educational concepts, teaching strategies and techniques, institutional liaison and group process. Admission by permission of the instructor (Summer)

**226 Internship and Seminar in Museum Education (6)**

Four-day-a-week placement in education departments in area museums supervised by George Washington University faculty. On-campus seminar includes grant proposal writing. Admission by permission of instructor (Spring)

**227 Museum Evaluation (3)**

Evaluation and research methods appropriate to the museum setting. Review of research on museum audiences, designing program and exhibit evaluations. Admission by permission of instructor. (Summer)

**228 Selected Topics in International Education (3)**

Investigation of historical development of international education; research on selected topics of general importance to the field of international education. Admission by permission of instructor. (Fall)

**229 Cross-Cultural Studies of Human Development (3)**

Theories of life-span development and of culture are the basis for the cross-cultural study of selected topics in human development. Prerequisite: Educ 206 (Fall)

**230 Managing Computer Applications (3)**

For managers and prospective managers in education and human services who are concerned with the automation of their operations. Basic principles needed to design, implement, and manage an information system. Prerequisite: permission of instructor. (Spring and summer)

**231 Educational Hardware Systems (3)**

Design and implementation of education hardware systems, including computers, videodisks, networks, film technology, video systems, and ITV.

**232 Applying Educational Media and Technology (3)**

Theory and practice of educational technology. Key characteristics of different media principles of application, and issues concerning their appropriate use.

**233 Supervised Experience in Education and Human Development Services (3 to 6)**

Admission by permission of instructor. (Fall and spring)

**234 Computers in Education and Human Development (3)**

The research and practice surrounding the use of computers in educational and training settings. Students will acquire the practical knowledge necessary to design, development and evaluation of computer-related curricula through the study of current software applications and programming environments.

**235 Design and Implementation of Educational Software (3)**

Theory and practice of creating educational software; psychological basis of using software in learning, instructional programs; authoring tools; artificial intelligence applications; interactive media. Students are required to design, program, and evaluate an educational program.

**240 Proposal Writing (3)**

The preparation of proposals for educational, business, and industrial applications, including those submitted for funding. Many styles and formats are illustrated. Each student will prepare a proposal in cooperation with an organization or agency. (Fall and summer)

**242 Fundamentals of Educational Administration (3)**

Organization, structure, and governance of public education: federal, state, and local responsibilities. Basic administrative leadership theory. Roles and functions of school administrators.

**243 Human Relations in Educational Management (3)**

Principles and practices in human relations for teachers, administrators, school personnel, parents, and community leaders. Current theoretical and research findings; applications to social change; techniques of working with individuals and groups.

**246 Administrative Issues in Education (3)**

Administrative strategies and practices appropriate to problems in education.



- 248 **Supervision and Evaluation of Instruction** (3) Saunders  
Study of interdisciplinary foundations of supervision. Special attention to the function of theory, change, individual and group relationships in organizations, staff influence processes, talent utilization, and evaluation of programs and staff. (Summer)
- 250 **Educating Language Minorities** (3) Staff  
A study of federal, state, and local policies and issues affecting the education of linguistically diverse populations. Resources for use with specific linguistically diverse groups. (Spring)
- 251 **Linguistic Applications in English as a Second Language** (3) Staff  
A study of the science of language and how its different branches (descriptive, social, applied, etc.) may be used for ESL teacher training, classroom instruction, material development, evaluation, research, and policy development. (Fall)
- 252 **The English Sound System in English as a Second Language** (3) Staff  
A description of the phonological composition and variation of English as applied to instructional practices specifically oriented toward linguistically diverse groups. (Fall)
- 253 **The Structure of English in ESL Practice** (3) Staff  
A review of the morphological and syntactic characteristics of English, as related to instructional practices specifically oriented toward linguistically diverse groups. (Spring)
- 254 **Issues, Studies, and Practices in English as a Second Language** (3) Staff  
A critical review of scholarship and research findings in English as a second language. Major policy issues and implications that relate to ESL practice. (Summer)
- 259 **The Principalship, K-12** (3) Saunders  
A general introduction to the principalship. Administrative tasks and procedures are stressed, together with the principal's role in handling educational issues and problems.
- 260 **Supervision in the Elementary and Secondary School** (3) Saunders  
For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools. Prerequisite: Educ 248. (Spring)
- 261 **Practicum in Human Development** (3) Rashid  
Open to human development majors with permission of instructor.
- 262 **Internship in Human Development** (3) Rashid  
Open to human development majors with permission of instructor.
- 267 **Practicum in College Student Development** (3 to 6) Burns  
Supervised practical experience in college student development programs. Admission by permission of instructor. (Fall and spring)
- 268 **Power, Leadership, and Education** (3) Boswell  
The nature of power, leadership, and education, the relationship of power to leadership, the essential nature of education in the exercise of power and leadership in a democratic setting. (Fall)
- 271 **Policy-Making for Public Education** (3) Boswell, Ferrante  
The nature of educational policy, the role of single-interest groups, the courts, legislative bodies, administrative bureaucracies, and professionals in establishing parameters and allocating resources. Analysis of specific techniques of policy formation. (Summer)
- 272 **Educational Planning** (3) Staff  
An examination of the planning movement in education: its historical development and the recent shift in premises, context, and expectations. Different approaches to the planning process; its relationship to the concepts of systems and futurism: participatory, sectorial, and regional aspects, role of research, and overview of main analytical techniques currently in use. (Fall)
- 273 **Foundations of College Student Development** (3) Burns  
College student development theories, practices, and problems, including historical overview and human development theories related to college students. (Fall)
- 274 **Group and Organizational Theories** (3) Burns  
Focus on theorists, including Argyris, Blau, Miles, Festinger, and Lewin, and practical application of theories to various organizational settings and individuals. Prerequisite: permission of instructor. (Spring)

- 275 School Finance (3)**  
Issues in financial support of public education. Local, state, and federal roles. Budget development and administration. *Star*
- 276 School-Community Relations (3)**  
The function, purposes, and resources of school public relations. Development of skills in planning public relations programs and activities. Theory and practice of effective communication. *Star*
- 277 Dynamics of Change (3)**  
An analysis of the process of change, particularly as it relates to educational policy. Comparison of theories; analytical tools; historical precedents; examples of federal educational policies. *Borwell*
- 278 School Law (3)**  
Constitutional and statutory provisions for public school education; origin and legal status of the local school unit; nature of the school board; legal status of teachers and administrators; legal rights and responsibilities of parents and pupils. (Spring) *Saunders*
- 279 Practicum in Supervision (3 to 6)**  
Practical experience in supervision of instruction. Admission by permission of instructor. (Fall and spring) *Saunders*
- 280 Internship in Supervision and Instructional Leadership (3 to 6)**  
Service in a school situation directed by the University's faculty and subject systems; integration of theory and practice. (Fall and spring) *Saunders*
- 281 Program Evaluation: Theory and Practice (3)**  
A general introduction to the theory of evaluation of social programs. Overview of evaluation models, methodology associated with program evaluation, and examination of evaluation in the context of political and social environments. (Fall) *Holmes*
- 282 Administration of College Student Development Services and Programs (3)**  
An overview of student affairs administrative practices, including needs assessment, planning models, budgeting, policy development, program development, facility management, evaluation, and team building. Admission by permission of instructor. (Fall) *Burns*
- 283 Higher Education in the United States (3)**  
History, scope, purpose, present status, programs, and trends in higher education in the United States. (Fall and spring) *Burns, Greenberg*
- 284 Administration of Higher Education (3)**  
Government, organization, and administration of colleges and universities; duties of trustees and administrators. (Fall and spring) *Burns, Ferrante, et al.*
- 285 Education and National Development (3)**  
Examination of the basic assumption that education contributes to national development. In addition to economic growth and civic identity, what constitutes national development in advanced industrial societies and societies moving to industrialism? What role does education play in promoting the process? (Fall) *Borwell*
- 286 Interpretation in the Historic House Museum (3)**  
Same as AmCv 286. Seminar integrating advanced practices of museum education with current scholarship in architectural history, material culture, social history, and women's studies. Extensive use of Washington museum resources. Open to undergraduate and graduate students. (Fall) *Star*
- 292 Practicum in Program Evaluation (3 to 6)**  
Supervised practical experience in field placements. Admission by permission of instructor. (Fall and spring) *Star*
- 293-94 Research and Independent Study (1 to 3)**  
Individual research under guidance of a staff member. Program and conference arranged with an instructor. (Academic year) *Paratore, Smith, Holmes*
- 295 Quantitative Methods II: Research Procedures (3)**  
Required of all candidates for master's degrees in education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 112, 212; or equivalent. (Fall and spring) *Star*
- 299-300 Thesis Research (3-3)**



- 301 **Advanced Study: Ideas, Issues, and Practices in Education** (3) Boswell  
For precandidates for the Ed.D. Alternative means of responding to the complexities of the educational process. Topics vary but concern education as an individual process and as sociocultural preservation and renewal.
- 302 **Quantitative Methods III: Inferential Techniques** (3) Holmes, Paratore, Smith  
Educ 302 or Stat 105 is required of all doctoral students in education. Prerequisite: Educ 212 or a basic statistics course and permission of instructor. (Fall and spring)
- 303 **Data Analysis** (3 to 6) Staff  
Use of computer in data analysis. For doctoral students at the dissertation-planning stage. (Fall and spring)
- 306 **Quantitative Methods IV: Advanced Research Design** (3) Holmes, Paratore, Smith  
Required of all doctoral students in education. Evaluation and application of educational research designs. Prerequisite: Educ 302 or equivalent. (Fall and spring)
- 307 **Qualitative Research Methods** (3) Holmes and Staff  
A general introduction to qualitative research procedures in social science research. Application of qualitative methods, design, analysis. (Fall)
- 329 **Seminar in Program Evaluation** (3) Holmes  
Contemporary problems and issues in evaluation of social programs design, implementation, analysis, and utilization. (Spring)
- 330 **Educational Facilities Planning** (3) Staff  
Principles of school plant planning; site selection; evaluation of existing buildings; adaptation to curricular needs, building operation and maintenance, disposition of surplus facilities; energy and accessibility considerations.
- 331 **Personnel Administration** (3) Staff  
Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions; current issues.
- 334 **Doctoral Internship in Educational Policy** (3 to 6) Holmes  
Supervised internship in education or human services settings for advanced doctoral students.
- 340 **Methods of Policy Analysis in Education** (3) Holmes and Staff  
Modes of analysis employed in the study of educational policy issues. Alternative methods of analysis for policy formation, implementation, and impact assessment. Both theoretical and case study materials are used. Prerequisite: Educ 295. (Fall and spring)
- 341 **Cognitive Models and Instruction** (3) Rashid  
Cognitive models (Gurilford, Bruner, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through adulthood. (Fall)
- 342 **Language Development** (3) Rashid  
Nature of language acquisition and development; emphasis on sociolinguistics and psycholinguistics most pertinent to education. (Spring)
- 343 **Advanced Studies in Human Development** (3) Rashid  
Review and consideration of empirical research studies on selected topics in human development. Issues, instrumentation, and research needs in respect to each topic discussed. Admission by permission of instructor. (Spring)
- 344 **Adult Development and Aging** (3) Rashid  
Theories and research on personality and cognition in adulthood and old age. Emphasis on evaluating research designs and methods and deriving implications of findings for gerontological programs and selected professional roles. (Spring)
- 345 **Advanced Studies in Educational Policy Analysis** (arr.) Holmes  
352 **Seminar: Western Educational Thought** (arr.) Boswell  
353 **Seminar: Higher Education Administration** (arr.) Greenberg, Ferrante, Gleazer  
354 **Seminar: Administration and Supervision** (arr.) Saunders

- 355 **Seminar: Applied Educational Administration** (3 to 6)  
Application of the theories and principles of administration to public and private schools. Field experience in a phase of administration and supervision. Admission by permission of instructor. (Fall and spring) Saunders
- 356 **Seminar: Human Development** (arr.) Rashin
- 369 **School Business Management** (3)  
Philosophy, responsibilities, and functions of school business management. Staff
- 372 **Internship in Higher Education** (3 to 6)  
Supervised experiences in selected areas in college teaching. Admission by permission of instructor. (Spring) Greenberg and Staff
- 373 **The Community Junior College** (3)  
The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges. (Fall and spring) Greenberg, Cleaver
- 374 **Current Issues in Higher Education** (3)  
Prerequisite: Educ 283, 284. (Spring) Ferrante
- 378 **Financing Higher Education** (3)  
Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices. (Spring) Staff
- 379 **Administration and Governance of Two-Year Colleges** (3)  
A study of the community junior college, focusing on administrative patterns and national, regional, state, and local influences, as well as the theory and structure of two-year college organization. (Fall and spring) Greenberg, Ferrante
- 380 **Legal Problems in Higher Education** (3)  
Investigation of legal problems in higher education related to the legal structure of higher education, religious concerns, students, faculty, and academic programs. (Spring) File
- 381 **College and University Curriculum** (3)  
Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall) File
- 382 **Teaching Strategies for Adult Learners** (3)  
Designing, implementing, and evaluating instructional strategies for adult learners. Assessing needs, writing objectives, selecting curriculum/content, selecting and implementing methods and techniques, selecting appropriate media, and evaluating instruction. (Spring) Greenberg
- 384 **College and University Governance** (3)  
Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284. (Fall) Ferrante, File, Greenberg
- 385 **Problems and Practices in Educational Administrative Organization** (3 to 6)  
Application of principles and practices concerned with change and evaluation in educational administration. Greenberg
- 386 **Internship: Higher Education Administration** (3 to 6)  
Service in a higher education situation directed by the University and the cooperating institution to integrate theory and practice. (Fall and spring) Brown, Saunders
- 387 **Internship: Administration** (3 to 6)  
Service in an educational institution or education-related program directed by the University's faculty. (Fall and spring) Ferrante
- 388 **Case Studies in Higher Education Administration** (3)  
An analysis of case studies related to administrative functions in colleges and universities. Staff
- 390 **Pre-Dissertation Seminar** (3 to 6)  
Required of all Ed.D. degree candidates. Approval of the dissertation research design is necessary for successful completion of the seminar. Admission by permission of instructor. Staff
- 391 **Dissertation Research** (arr.)  
Prerequisite: Educ 390.



## ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors R.B. Heller, W.K. Kahn, R.L. Pickholtz, M.F. Eisenberg, A.C. Meltzer, W.D. Maurer, A.D. Friedman, H.J. Helgert, R.H. Lang, N. Kyriakopoulos, J.D. Foley (Chair), T.N. Lee, E. Della Torre, R.J. Harrington, L.J. Hoffman, O.N. Garcia, W. Wasylkiwskyj, N.A. Alexandridis, S.Y. Berkovich, M.B. Feldman, S.J. Raff (Research), M.H. Loew, G.V. Bergiotti, R.L. Carroll, Jr., M.E. Zaghoul, M. Pardavi-Horvath

Adjunct Professors J.M. Ain, P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, C. Alexander, Jr.

Professorial Lecturers H.-L. A. Hung, A.A. Wolf, W.D. Jackson, W.T. Bisignani, R.K. Khatri, C.E. Dunham, L.M. Leibowitz, P.M. Kelly, M. Mohajer, F. Dellon, J.R. Silverman, J.A. Knight, J.H. Scharen-Guivel, M.H. Friedman, T.T. Nieh, G.M. Borsuk, J. Donelson III, J.W. Benoit, R.A. Herring, Jr., A.F. Manfredi, Jr., A.K. Mehrotra, C.-H.C. Wang, W.W. Wu, R.M. Finn, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, M.S. Gluck, D.R. Smith

Associate Professors D.C. Rohlfis (Director of Laboratories), J.L. Sibert, P.S. Bock, D.B. Newman, Jr., N.S. Chauhan (Visiting), Z. Kitov (Research)

Associate Professorial Lecturers M.C. Chen, R.D. Angelari, J.C.-C. Hsing, G.R. Lawrence, J.W. Fussell, P.A. Lamb, C.V. Stewart, A.L. Bretler, P.K. Wahi, C.A. Eldridge, J.A. Lipkin, Y.-S. Fu, C.M. Waespy, J. Epstein, L.A. Fletcher, J.S. Davies, Jr., A.T. Lo, E.B. Leiderman, E.H. Neal, J.J. Seppy, L.L. Burge, J.E. Pfaendner, C.E. Knadler, Jr., E.A. Walker

Assistant Professors S. Rotenstreich, D. Saha, R.S. Heller, A.K. Kakaes, C.D. Martin, B. Narahari, H. Senay, A. Youssef, H.-A. Choi, K.B. Eom, J.K. Hahn

Assistant Professorial Lecturers T.R. Husson, K.J. Schmucker, J.B. Bronder, S.J. Koch, J.D. Kotulski, R.M. Tarakan, E.A. Walker, T. Nelson, R.M. Holland, J.W. Sargent, M.F. D'Antonio, M.C. McElvaney, Y.K. Park, E.S. Armstrong, J.F. Kuehls, D.D. Moerder

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees

Note: Doctoral students must select a minimum of three of the courses designated with an asterisk as part of the program in the major area

## ELECTRICAL ENGINEERING

201 **Signals and Transforms in Electrical Engineering** (3) Wasylkiwskyj and Staff  
Fourier transforms, singularity functions, functions of a complex variable, calculus of residues, techniques of contour integration, integral representation of special functions. The unilateral and bilateral Laplace transforms, Fourier transforms in the complex domain, causal and analytic signals, Hilbert transforms, the z-transform (Fall and spring)

202 **Linear Systems Theory** (3) Kyriakopoulos and Staff  
Introduction to linear systems theory. Topics include linear vector spaces and linear operators, mathematical representation of dynamic linear systems, concept of state and solution of the state equation, controllability and observability, canonical forms of the state equation, state feedback, and state estimation (Fall and spring)

203 **Graph Theory and Applications** (3) Kakaes and Staff  
Undirected and directed graphs. Connectivity, partitions, cycles and matchings. Edge and vertex coloring, chromatic polynomials, and the four-coloring problem. Planar graphs and Kuratowski's theorem. Properties of random graphs. Applications to a variety of problems. (Spring)

204 **Stochastic Signals and Noise** (3) Saha and Staff  
Basic concepts of probability: random variables: discrete and continuous, transformation and applications, sequence of random variables, characteristic function, central limit theorem, LMS estimation; random process: stationarity, Gaussian process, correlation, power spectrum, LMS estimation, linear filtering. Prerequisite: APSC 115 or equivalent (Fall and spring)

205 **Stochastic Processes in Electrical Engineering** (3) Saha and Staff  
Markov process, Kolmogorov equation, birth-death process, queuing model for networks, Wiener process, martingales, diffusion processes. Estimation of power spectra. Discrete time Kalman filtering. Stochastic difference and differential equations. Applications to communications, control, propagation, random media and computer science. Prerequisite: EE 204 or equivalent. (Spring)

**206 Electromagnetic Theory I (3)**

Electrostatic fields, multipoles, dielectric media, boundary conditions, uniqueness theorem. Solution of electrostatic problems; separation of variables and Green's function techniques. Energy relations and forces. Steady-state currents, magnetic fields, vector and scalar magnetic potentials. Prerequisite: EE 205 or equivalent; concurrent registration: EE 201. (Fall) Lang and Staff

**207 Electromagnetic Theory II (3)**

Maxwell's equations, moving media, vector wave equations. Poynting vector theorem, time-harmonic solutions. Plane waves in isotropic and anisotropic media, polarization, phase and group velocity. Reflection and refraction of plane waves at interfaces. Radiation, dyadic Green's functions and aperture diffraction. Prerequisite or concurrent registration: EE 201. (Spring) Lang and Staff

**208 Digital Image Processing (3)**

Properties of images and visual systems. Image acquisition, sampling, quantization. One- and two-dimensional image transform techniques, enhancement and restoration. Image coding and data compression. Segmentation, representation, boundary and shape, texture, matching. Image understanding. Computer applications and projects. Prerequisite: EE 204. (Spring) Loew and Staff

**212 Network Analysis (3)**

Network theorems, functions, and properties. Introduction to the theory of linear networks, nonlinear resistive network equation formulation, hybrid and other nonlinear equations. Nonlinear dynamic network equation formulation, state space, conditions for existence. Concepts of stability in nonlinear networks, conservative and Lagrangian networks and systems. (Fall, odd years) Zaghloul and Staff

**\*213 Computer-Aided Design of VLSI Circuits (3)**

Characteristics of digital electronic design, design environment, algorithm, simulation techniques. Logic level, switch level, timing verification. Geometric design rule, checker node extraction, output design aids. Prerequisite: EE 126 or permission of instructor. (Spring, odd years) Zaghloul and Staff

**214 VLSI Design (3)**

Advanced design and analysis techniques for VLSI circuits. Design of combinational VLSI circuits, noise consideration, semi-custom design gateways. Techniques for data-path and data-control design. Simulation techniques. Students design VLSI system using CAD computer and simulate design. Prerequisite: EE 126 or permission of instructor. (Fall, odd years) Zaghloul and Staff

**215 Linear Network Synthesis I (3)**

Properties and testing of positive real functions. Synthesis of LC, RL, and RC one-port networks. Brune, Bott-Duffin, Mivata, Kuh, and Darlington synthesis techniques. Introduction to two-port ladder and lattice synthesis. Three-terminal network synthesis approximation in the frequency and time domains. Prerequisite: EE 202 or permission of course director. (Fall, even years) Lee and Staff

**\*216 Synthesis of Active and Distributed Networks (3)**

Active network synthesis using negative resistors, control sources, NIC operator and operational amplifiers. Uniform and nonuniform distributed network analysis and synthesis—computer-aided design. Prerequisite: EE 215. (Spring, odd years) Lee and Staff

**217 Neural Networks (3)**

Theory of neural network models, relation to biological models. Examples of known models. Possible applications of neural networks. Neural network VLSI implementations, digital vs. analog approaches. Building blocks. Examples of realized neural networks. (Spring, even years) Zaghloul and Staff

**218 Analog MOS VLSI Circuits for Signal Processing (3)**

MOS technology: building blocks, devices, capacitors, limitations. Operational amplifiers and other analog systems. Layout examples and design principles. Students use the CAD VLSI laboratory to design and simulate circuits. Prerequisite: EE 126 or equivalent. (Fall, even years) Zaghloul and Staff

**219 Digital Filter: Design and Realization (3)**

Digital signals and systems, basic block of digital filters, stability considerations. Analysis of digital filters. Design of IIR and FIR digital filters. Computational techniques. Direct and indirect realization of digital filters. Applications. Prerequisite: EE 202 or permission of course director. (Spring, odd years) Zaghloul and Staff



- 221 Physical Electronics I (3)** Wasyliwskyj and Staff  
Theoretical principles underlying the operation of electronic devices. Foundations of quantum mechanics: Lagrangian and Hamiltonian. Quantum mechanics. Particle-wave duality. Wave mechanics and matrix mechanics. Quantum theory of electrons. (Fall)
- 222 Physical Electronics II (3)** Wasyliwskyj and Staff  
The Boltzmann transport equation. Particle statistics (Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distribution). Electrons in a crystal: band theory of semiconductors. Physical principles of semiconducting devices (junctions, surfaces, contacts, transistors, Gunn-diodes) and lasers. Prerequisite: EE 221. (Spring)
- 223 Optical Communications Systems (3)** Kahn and Staff  
Optical communications channels, survey of laser sources, modulation, line-of-sight links; system models and analysis; detection, noise mechanisms, and signal-to-noise analysis; optical-fiber waveguides, repeaters, and systems analysis; integrated optical components. Prerequisite: EE 207, 243 (Spring, odd years)
- 224 Electronics of Lasers (3)** Kahn and Staff  
Basic concepts from quantum mechanics, Einstein coefficients, inversion and pumping mechanisms, rate equations. Resonators, He-Ne laser, organic dye lasers, injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 222 or equivalent. (Fall 1990 and every third year thereafter)
- 225 Nonlinear Electronics (3)** Heller and Staff  
Analysis and design of electronic components and systems operating as switching, sweeping, gating, and pulse generators. Study of multivibrators, negative resistance devices and amplifiers, nonlinear operation of oscillators. Prerequisite: EE 201 or equivalent. (Fall, even years)
- 226 Fiber and Integrated Optics (3)** Kahn and Staff  
Propagation in stepped-index and gradient-index optical fibers: scattering and attenuation, phase velocity, group velocity, impulse response, energy transport, ray tracing, Goos-Haenchen shift, Hamiltonian formalism. Directional couplers, modulators, and deflectors in fibers and surface films. Coupled-mode theory. Prerequisite: EE 133 (Spring, even years)
- 227 Industrial Electronics (3)** Heller and Staff  
Applications of electronic devices in industry, continuous and sampled control systems, induction and dielectric heating, timing and counting circuits, reliability and automatic checking equipment, digital control of machine tools. Prerequisite: EE 201 or equivalent and graduate status (Fall, odd years)
- 228 High-Frequency Electronics (3)** Heller and Staff  
Design and analysis of the operation of electron-tube, solid-state, crossed-field, space-charge wave, and quantum maser oscillators and amplifying devices that lay the foundation of modern communications systems. Prerequisite: EE 207 or equivalent. (Spring, even years)
- 230 Design of Memory Devices (3)** Della Torre and Staff  
Physical principles of magnetic and semiconductor memory devices. Design and manufacture of Ram's and disk files. Device and system characteristics reliability. Prerequisite: EE 122 (Spring, odd years)
- 232 Electrodynamics (3)** Wasyliwskyj and Staff  
Special theory of relativity. Transformation and covariance of electrodynamics. Relativistic particles in external fields. Magnetohydrodynamics. Plasmas, pinch effect, instabilities. Radiation from accelerated particles. Prerequisites: EE 207 (Spring, every third year)
- 233 Microwaves and Components (3)** Kahn and Staff  
High-frequency transmission lines and guided systems, matching techniques, scattering parameters, transfer parameters, directional couplers, cavity resonators, Faraday rotation, ferrite isolators and circulators. Prerequisite: EE 133. (Fall)
- 234 Wave Propagation in Inhomogeneous Media (3)** Wasyliwskyj and Staff  
Electromagnetic and acoustic propagation in inhomogeneous media, WKB approximation, geometrical optics, layered media. Stationary phase and steepest descent evaluation of integrals, using techniques of functions of a complex variable; application to field computation at caustics. Prerequisite: EE 207. (Spring, even years)

**235 Antennas (3)**

General solution of Maxwell's equations in terms of current sources, polarization, far-field approximations, radiation from current distributions, field equivalence theorems, geometrical optics approximation, aperture antennas, receiving antennas, theory of arrays, and applications to specific antennas and antenna types. **Prerequisite:** EE 133. (Spring, odd years) **Kahn and Stull**

**236 Electromagnetic Radiation and Scattering (3)**

Electromagnetic scattering by simple shapes, asymptotic high-frequency approximations, creeping waves, geometrical theory of diffraction. Approximation techniques in radiation and scattering: Rayleigh and Born approximations. **Prerequisite:** EE 201, 207. (Fall, odd years) **Stull**

**\*237 Waves in Random Media (3)**

Propagation and scattering of electromagnetic, optical, and acoustic waves in random media, scattering from rough surfaces and randomly distributed particles, turbulence. Applications to propagation through rain and fog. Laser beam scintillations, remote sensing, and communications channel modeling. Monte Carlo simulation. **Prerequisite:** EE 204, 207. (Fall, even years) **Lang and Stull**

**238 Remote Sensing (3)**

Active and passive remote-sensing systems: scatterometers, real-aperture imaging, and synthetic-aperture radars. Sensing of surface, subsurface, and atmospheric parameters at microwave, infrared, and optical frequencies. Analysis of radiometric techniques using radiative transport theory, inverse scattering methods, profile inversion. **Prerequisite:** EE 133. (Spring, odd years) **Lang and Stull**

**239 Numerical Electromagnetics (3)**

Numerical methods for the solution of electromagnetic problems dealing with scattering by complex shapes, antenna design, transmission through anisotropic and dispersive media, electrodynamic interactions with charged particles, convergence experiments dealing with moment methods, hybrid GTD, variational computations. **Prerequisite:** CSci 100, EE 155, 207. (Spring, even years) **Della Torre and Stull**

**241 Information Theory (3)**

The concepts of source and channel. Measure of information, entropy, mutual information. The noiseless coding theorem. The noisy coding theorem. Channel capacity: symmetric and nonsymmetric channels. Gaussian and binary symmetric channels. Rate-distortion theory. Basics of multiple-user information theory. **Prerequisite:** EE 204. (Fall) **Saha and Stull**

**242 Coding Theory (3)**

Linear codes: parity and generator matrices, syndrome error correction and deletion capability, minimum distance. Performance bounds of linear codes. Hamming and Golay codes. Galois fields, shift-register implementation of cyclic codes. BCH codes: the BCH decoding algorithm, burst-correction codes. **Prerequisite:** EE 204. (Spring) **Pickholtz and Stull**

**243 Communication Theory I (3)**

Optimum receivers for vector channels and for the additive white Gaussian noise channel, correlation detectors, matched filters; coherent and noncoherent detection; bounds on the performance of communications, comparison of communications systems. **Prerequisite:** EE 204 or equivalent. (Fall and spring) **Pickholtz and Stull**

**244 Communication Theory II (3)**

Schemes for efficient signaling for data sequences; effects of quantizing at the receiver. Practical implementation of orthogonal and simplex coded communications. Convolutional codes; bounds on performance decoding by sequential (Zigangirov-Jelinek, Fano) and MAP (Viterbi) algorithms. Topics from advanced communications. **Prerequisite:** EE 243. (Spring) **Pickholtz and Stull**

**245 Signal Detection and Estimation Theory (3)**

Statistical detection theory, hypothesis testing, sequential detection, estimation theory, maximum likelihood and Bayes methods, estimation of signal parameters and continuous waveforms, Wiener and Kalman filters, applications to the design of optimum receivers, adaptive systems. **Prerequisite:** EE 241, 244 or equivalent. (Fall) **Pickholtz and Stull**

**246 Digital Communications (3)**

Analysis and design of digital communications systems for voice, video, and data. Digital coding of waveforms: Nyquist criteria, intersymbol interference (ISI). Partial response signaling. Practical considerations in design of modems. **Prerequisite:** EE 241, 244 or equivalent. (Fall) **Pickholtz and Stull**



- Digital switching and integrated services digital networks. Prerequisite: EE 244. (Fall)
- 247 **Communications Systems** (3) Saha and Staff  
Digital communications systems. Generation of carrier phase references using phase-locked loops (PLL). Optimum design of PLL. Maximum-likelihood estimation of carrier phase and symbol timing. Performance degradation. Applications to PCM, TDMA, and spread-spectrum systems. Prerequisite: EE 244 or equivalent. (Spring)
- 248 **Computer Communication Networks I** (3) Helgert and Staff  
Local and wide area switched networks. Topologies, architectures, the OSI Reference Model. Data transmission techniques, synchronous and asynchronous communications, baseband signaling modems. FDIX and TDM. Error-control, data link control, flow-control, binary and HDLC procedures. Network protocols. Prerequisite: EE 144 or equivalent. (Fall and spring)
- 249 **Computer Communication Networks II** (3) Helgert and Staff  
Design and analysis of computer communication networks. Circuit and packet switching. Traffic theory for data. Queuing models. Buffer design and statistical multiplexing. Delay and cost minimization, topological design algorithms. Network routing and flow control. Analysis of multiple-access algorithms. Prerequisite: EE 204, 248. (Spring)
- 250 **Telecommunications Security Systems** (3) Newman and Staff  
Cryptography. Speech and data scrambling. Nonlinear transformations. Block and stream ciphers. DES algorithm and public key cryptography. Key management, digital signatures, and authentication. Data communication security protocols. Secure voice communications. Companion course to CSci 229. Prerequisite: EE 204. (Spring, odd years)
- 251 **Switched Telecommunication Networks** (3) Kakaes and Staff  
Switching technology and traffic models for circuit, packet, and integrated networks. CCIS and SS7. Analytical bounds on the complexity of switched networks. Digital time-division and store-and-forward switches. Mobile switching office and cellular networks. PEABX and distributed switching. Prerequisite: permission of course director. (Spring, even years)
- 252 **Digital Signal Processing Techniques** (3) Kyriakopoulos and Staff  
Signal representations, sampling and quantization, transform techniques. Recursive estimation, linear predictive filtering, recursive and nonrecursive digital filter design. Computer-aided design. Prerequisite: CSci 51 or equivalent. (Fall, even years)
- 254 **Radar Systems** (3) Borgiotti and Staff  
The radar range equation. Radar cross section of targets, target detection and parameter estimation, detection in clutter. Resolution, ambiguities, and signal design. Moving-target indicators. Pulse Doppler radar, radar antennas, phased arrays. Synthetic aperture and space-based radar. Prerequisite: EE 133, 204. (Spring)
- 255 **Optical Processing** (3) Kahn and Staff  
Fourier transforms by diffraction of light, optical spectrum analysis, optical memories and systems, holography and holographic techniques, properties and techniques for photographic reproduction. Prerequisite: EE 201. (Fall, even years)
- 257 **Secure Communications** (3) Pickholtz and Staff  
Spread-spectrum techniques, time and frequency hopping, direct sequence encoding. Link jamming models and jamming effectiveness. Adaptive null steering arrays, nulling algorithms, effects of intelligent jammers. Low probability of intercept. Prerequisite: EE 243. (Fall, even years)
- 258 **Radio Communications Systems I** (3) Lang and Staff  
Analysis and design of microwave communications systems. Free-space propagation, knife-edge diffraction, atmospheric refraction and troposcatter. Time-variant channel characterization. Diversity reception. Spectral characteristics of radio signals. Design of line-of-sight, troposcatter, and cellular mobile systems. Prerequisite: EE 133, 243. (Fall)
- 259 **Radio Communications Systems II** (3) Lang and Staff  
Analysis and design of ionospheric communication systems. Morphology of the ionosphere and propagation of ionospherically reflected radio waves. RAKE receiver and adaptive channel equalization. Wideband HF, atmospheric noise,

- and non-Gaussian channel performance. Design of VLF, LF, HF, and meter-burst systems. Prerequisite: EE 258 or permission of instructor (Spring)
- \*260 **Introduction to Applied Superconductivity** (3) Harrington and Staff  
Thermodynamic and quantum properties of superconductors. High-temperature superconducting materials. Electrical and magnetic characteristics. Material preparation. Wire construction. The theory of superconducting magnets, transformers, machines and applications to computers. Prerequisite: permission of course director. (Fall, even years)
- \*261 **Electromechanical Energy Conversion** (3) Harrington and Staff  
Characteristics of synchronous machines, synchronous reactance, reactance theories, synchronizing generators and parallel operation of machines, characteristics of asynchronous machines, machines as circuit elements. Steady-state and dynamic performance of alternating current machines. Prerequisite: EE 202, 206 or permission of course director. (Spring, even years)
- \*262 **Power Electronics** (3) Harrington and Staff  
Dynamic requirements of industrial drives. Detailed analysis of inverter circuits. Frequency control of inverter drives and cycloconverters. Computer modeling of rectifier and inverter circuits. Feedback control loops and their effect on stability. Prerequisite: EE 177 or permission of course director. (Spring, even years)
- 263 **Design of Reliable Emergency and Standby Power Systems** (3) Harrington and Staff  
General requirements and guidelines. Factors affecting power-line disturbances. Characteristics of system protection. Disturbance effects on computer power supplies. Grounding and noise control. Reliability evaluation from an economic viewpoint. Practical application problems. Prerequisite: EE 202, 206, or permission of course director. (Spring, odd years)
- \*264 **Direct Electrical Energy Conversion** (3) Harrington and Staff  
Theory and practice for direct production of electricity using solar cells, thermionic converters, fuel cells, and batteries. Concepts of solid-state energy barrier work function and conversion efficiency, and limitations. Prerequisite: EE 202, 206, and permission of course director. (Fall, odd years)
- 265 **Transients in Electrical Power Transmission Lines** (3) Harrington and Staff  
Switching and lightning surges and the resultant overvoltages on long lines. Breaker closing sequence effects and effect of source side inductance and multiple infeeds. Recovery voltage after short line faults. Methods and effectiveness of protection. Calculation of overvoltages and insulation level requirements. Prerequisite: EE 202, 206, or permission of course director. (Fall, odd years)
- 266 **Electrical Power Transmission I** (3) Harrington and Staff  
EHV AC power transmission. Overhead line and underground cable transmission systems. Symmetrical components; short-circuit studies; load flow, transient stability, and sustained fault analysis, multimachine systems; machine and system modeling. Prerequisite: EE 178, 261, 265. (Spring, even years)
- 267 **Electrical Power Transmission II** (3) Harrington and Staff  
Practical studies using a computer in the following areas: load-flow analysis, short-circuit analysis, transient stability, design of power system networks, protection coordination. Prerequisite: EE 266. (Fall, even years)
- 268 **Electrical Power Distribution** (3) Harrington and Staff  
Transformer and insulation design at distribution voltage levels. Medium- and low-voltage switchgear requirements. Protective relaying, harmonic resonance, power-factor correction, grounding systems. Prerequisite: EE 178, 202, and permission of course director. (Spring, odd years)
- 269 **Issues in Electrical Power Generation and Transmission** (3) Harrington and Staff  
Assessment of various energy systems. Interfacing of different types of energy systems. Dispersed generation, concepts of conversion and cogeneration. Protection control. Biological effects of high electric and magnetic fields. Prerequisite: EE 264, 267, and permission of course director. (Spring, odd years)
- \*271 **Linear Multivariable Control Theory** (3) Carroll and Staff  
Control of systems having multiple inputs or outputs. Frequency-domain techniques in linear quadratic Gaussian, loop transfer recovery,  $H^2$ , and  $H^\infty$  array design. Prerequisite: EE 172, 202, 273. (Spring, even years)



- 272 Computer Control Systems (3)** Carroll and Staff  
Analysis of automatic control systems in which the control procedure uses on-line digital computation. Topics include single- and multirate sampling, z-transforms, responses of discrete systems, stability criteria, and discrete control design. Prerequisite or concurrent registration: EE 202. (Fall)
- 273 System Optimization (3)** Carroll and Staff  
Parameter optimization problems, theory of minima and maxima. Optimization problems for dynamic systems, calculus of variations, the maximum principle and the Hamilton-Jacobi equation. Optimization problems with constraints, optimal feedback systems. Numerical solution of optimal problems. Prerequisite: EE 202 or equivalent. (Spring)
- \*274 Nonlinear Systems (3)** Carroll and Staff  
Definition of linear and nonlinear systems; introduction to approximate analysis of nonlinear systems—describing functions, Krylov and Bogoliubov asymptotic method, and Tsytkin locus. Forced oscillations—jump resonance. Stability analysis—Liapunov criterion. Lur'e problem and Popov method. Prerequisite: EE 202. (Spring, odd years)
- \*275 System Identification and Adaptive Control Systems (3)** Carroll and Staff  
Identification is the process of mathematically modeling a system based on measurement data that may be limited or uncertain. Adaptive control is the means whereby a system that is poorly modeled is adequately controlled. Various approaches to each of these problems are discussed. Prerequisite: EE 202, 204. (Spring, even years)
- 276 Design and Applications of Robotic Systems (3)** Carroll and Staff  
Topics related to robotics: coordinate transformations, kinematics, dynamics of robot manipulator arms, trajectory planning, sensors, internal transmissions, actuators, robot control systems design, vision systems, and programming languages. Prerequisite: ApSc 58, CSci 100. (Spring)
- \*277 Satellite Communications Systems (3)** Pickholtz and Staff  
Theory and applications of satellite communications. Modulation and multiple-access techniques. Link design. Satellite transponders and antenna systems. Ground stations. Random-access techniques and satellite packet communications. Prerequisite: EE 244. (Fall)
- 278 Spacecraft Systems Design (3)** Heller and Staff  
Space environment; structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and reentry problems; bioastronautic considerations. Prerequisite: graduate status. (Spring, even years)
- \*279 Stochastic Control Systems (3)** Lee and Staff  
Introduction to random process in control systems. Properties of Markov process, systems of covariance equivalence and of deterministic and stochastic control equivalence; dynamic programming for Markov process—principle of optimality; linear systems with quadratic cost. Kalman filtering, smoothing, and predicting. Prerequisite: EE 204, 273. (Fall, odd years)
- 280 Introduction to Medicine for Engineers I: Physiology and Anatomy (3)** Eisenberg and Staff  
The physiology of the human body from a systems viewpoint. Concepts of cellular structure and function integrated into the tissues and organs and related to the various systems of the body. Interrelationships of the body systems. (Fall)
- 281 Introduction to Medicine for Engineers II: Physiology and Anatomy (3)** Eisenberg and Staff  
Further elaboration of physiological systems, such as the endocrine system, renal physiology, gastrointestinal physiology, integration of the separate systems to present the functioning of the body as an overall system. Prerequisite: EE 280. (Spring)
- 282 Medical Measurements I (3)** Eisenberg and Staff  
Theory of measurements in biological areas, techniques for electronic measurements on biological specimens, current problems in medical metrology, stress-inducing electronic systems. Prerequisite: EE 280 or permission of course director. (Fall)

- 283 Medical Measurements II (3)** Eisenberg and Staff  
Medical telemetry systems, medical use of the computer, engineering techniques in patient treatment, principles of good medical instrumentation. Prerequisite: EE 280 or permission of course director. (Spring)
- 285 Evoked Potentials I (3)** Eisenberg and Staff  
Physiological significance of the sensory-evoked potentials, stimulation variables, subject variables, data acquisition procedures and instrumentation, signal averaging computers, analysis techniques for the VEP, applications of the VEP. Lectures, discussion, and laboratory. Prerequisite: EE 281, 282, 283, or permission of course director. (Fall)
- 287 Rehabilitation Medicine and Engineering (3)** Eisenberg and Staff  
Cross-sectional view of those areas of medicine most involved with the treatment of handicapped individuals. Application of engineering theory and techniques to the rehabilitation of handicapped individuals. Major problem areas and general solutions, solutions to some specific problems. Prerequisite: EE 289 (Spring, odd years)
- \*289 Clinical Medicine for Engineers (3)** Eisenberg and Staff  
Overview of clinical medicine with emphasis on those areas most affected by engineering and technology. Prerequisite: EE 281, 282, 283. (Fall, even years)
- 297 Special Topics in Electrical Engineering (1 to 3)** Staff  
Topics to be announced in the Schedule of Classes. (Fall and spring)
- 298 Research (arr.)** Staff  
Applied research and experimentation projects, as arranged. May be repeated for credit
- 299-300 Thesis Research (3-3)** Staff
- 319 Systems Science, Networks, and Controls Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)
- \*321 Approximate Mathematical Techniques for Electromagnetics (3)** Lang and Staff  
Asymptotic methods for Maxwell's equations, geometric optics, WKB approximation for stratified media, uniform expansion near a caustic and shadow boundary. Perturbation techniques for tenuous medium. Rayleigh-Gans approximation, smoothing, and multivariable methods for stochastic problems. Prerequisite: EE 204, 207. (Spring, every third year)
- \*322 Advanced Waveguide Diffraction and Design (3)** Kahn and Staff  
Selections from the following: Analytical treatment of waveguide bifurcations and discontinuities by Wiener-Hopf, mode matching, static approximation. Small apertures (obstacles) in waveguides. Variational methods for evaluation of equivalent circuit parameters. Group theoretic methods for symmetrical junctions. Prerequisite: EE 243. (Fall, every third year)
- 323 Principles of Microelectronics (3)** Heller and Staff  
Basic principles, techniques, and processes necessary for understanding microelectronics. Semiconductor physics, phase diagrams, crystal growth, epitaxial vacuum techniques, thin-film deposition, diffusion, oxidation, junction formation, masking, and properties of thin films and materials. Prerequisite: EE 212 or equivalent. (Fall, odd years)
- 329 Electrophysics Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)
- \*335 High-Resolution Antenna Array Processing Techniques (3)** Wasylkiwsky and Staff  
Review of electromagnetic-wave propagation, radiation and reception by array antennas, antenna arrays as multipoint receivers. Angle-of-arrival estimation using the Prony method and related techniques. Application to radar multipath problems and angle-of-arrival estimation. Prerequisite: EE 204, 207. (Fall, even years)
- \*345 Advanced Detection Theory (3)** Pickholtz and Staff  
Linear estimation, Wiener and Kalman-Bucy filters, nonlinear and angle modulation, phase-lock loops, rate-distortion theory. Gaussian processes, detection and parameter estimation, canonical receivers, structures, and performance calculations for diversity systems, multiple-pulse radars, stationary processes, and threshold receivers. Prerequisite: EE 245. (Spring)



- \*346 Telecommunications Protocols (3)** Helgert and Staff  
Layered protocol models for computer communications networks. Open systems interconnection reference model. CCITT and ISO protocol standards in support of OSI. Proprietary communications architectures. TCP/IP, SNA, and DNA. Protocols for local area networks and integrated services digital networks. Prerequisite: EE 248. (Fall)
- \*347 Telecommunications Software Engineering (3)** Helgert and Staff  
Formal description techniques for protocol specification. Graphic and matrix representations of finite-state protocol models. Specification and Description Language (SDL) and CCITT High-Level Language (CHILL). Software implementations of computer communications protocol architectures. Prerequisite: EE 346. (Spring)
- \*348 Telecommunications Networks (3)** Helgert and Staff  
Wide area circuit-switched and packet-switched data communications networks. Subscriber access arrangements and subscriber signaling systems. Network services and performances. Network management. Local and metropolitan area networks. IEEE protocol standards. FDDI, narrowband, and broadband integrated services digital networks. Prerequisite: EE 248. (Fall, odd years)
- 349 Communications Research (arr)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)
- \*364 Applications of Direct Energy Conversion (3)** Harrington and Staff  
Electrostatic and magnetic conversion systems, conversion of heat to electricity, thermoelectric systems, conversion of light to electricity, fuel cells and batteries, magnetohydrodynamic systems, superconductive machines and systems. Prerequisite: EE 264. (Spring, even years)
- \*368 High-Voltage Testing Techniques for Electrical Apparatus (3)** Harrington and Staff  
Methods and procedures for measurement of high voltage; basic testing techniques for alternating voltages, direct voltages, lightning-impulse voltages, switching-impulse voltages, and impulse currents. Determination of the dielectric strength of electrical insulation materials at power frequencies. The use of sphere gaps for the measurement of peak values. (Spring, even years)
- \*371 Simulation Methods for System Analysis (3)** Bock and Staff  
Survey of simulation languages. Techniques of model building for material- and machine-based systems. Treatment of these systems with notion of transactions and states. Modeling the dynamic processes of growth problems. Analog, hybrid, and digital methods for simulation. Prerequisite: CSci 278. (Fall, odd years)
- \*372 Analysis and Control of Large Systems (3)** Lee and Staff  
Systems as multistage decision processes. Analytical concepts of model making and matrix representations of large systems. Approximation by models of lower dimension. Reduction to simplified models, decentralized systems. Differential games, computation of saddle points, construction of an equilibrium point. Prerequisite: EE 273. (Fall, even years)
- \*381 Computer-Aided Analysis of Physiological Signals (3)** Loew and Staff  
Acquisition of data from the cardiovascular, pulmonary, and nervous systems. Sources and detection of the signals; physiological limitations; preprocessing and noise reduction. Transformations, data reduction, representation, display, and decision aiding for clinical use. Computer projects. Prerequisite: EE 280, 281, 282, 283, and permission of instructor. (Fall, even years)
- \*382 Physiological Controls and Systems (3)** Loew and Staff  
Some applications of control and systems theory in the medical and biological fields. Application of general control and systems theory as applied to physiological systems. Specific applications of control and systems theory to the visual system, respiratory system, cardiovascular system, and musculoskeletal system. Prerequisite: EE 172 or equivalent, 281, 282, 283. (Spring, even years)
- \*384 Medical Imaging (3)** Loew and Staff  
Principles of projection radiography, fluoroscopy, tomography, ultrasound, and nuclear sources (PET, SPECT); biomagnetic imaging. Characterization of source and object; recorder resolution and noise. Scatter and attenuation. Reconstruction algorithms and implementations for CT and MRI. Recent developments. Prerequisite: EE 201 or equivalent, 280, 281, 282, 283. (Fall, odd years)

- \*385 Evoked Potentials II (3)** Eisenberg and Staff  
Advanced lecture, discussion, and laboratory. Current topics in sensory-evoked potentials research, with emphasis on clinical applications. Planning and conducting of an advanced (clinical or research) project chosen to take maximum advantage of the student's technical background in instrumentation, computer, and data analysis. Prerequisite: EE 285. (Spring, odd years)
- \*386 Bioelectromagnetics (3)** Eisenberg and Staff  
Electrical properties of biological tissues. Mechanisms for electromagnetic interactions with biological systems. Non-ionizing radiation dosimetry and quantification. Temperature measurement in the presence of a strong electromagnetic field. Physical aspects of diathermy and hyperthermia. Therapeutic and diagnostic applications. Prerequisite: EE 32, 281. (Fall, odd years)
- 387 Bioelectric Phenomena (3)** Loew and Staff  
Mathematical treatment of selected bioelectric phenomena. Membrane thermodynamics and electrical potentials; subthreshold membrane effects and membrane dynamics. Solid-state phenomena in biology and medicine. Photoconduction. Nerve propagation and electrical models of the heart. Cell physiology. quantum effects. Prerequisite: EE 206, 280, 281, 282, 283. (Spring, even years)
- 389 Medical Engineering Research (arr.)** Staff  
Limited to students working on the Doctor of Science dissertation. May be repeated for credit. (Fall and spring)
- 390 Colloquium (0)** Lang and Staff  
Lectures by outstanding authorities in electrical engineering and computer science. Topics to be announced each semester. (Fall and spring)
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit
- 450 Principles of Telecommunications (3)** Pickholtz and Staff  
Elements of telecommunications system, representation of signals in the frequency domain, and bandwidths of voice, data, and video signals. Signal and noise distortion, and channel capacity. Modulation, multiplexing, and digital communications. May not be applied toward a graduate degree in the School of Engineering and Applied Science. (As arranged)
- 451 Telecommunications Transmission Systems (3)** Pickholtz and Staff  
Introduction to the use of microwave, fiber-optic, and satellite computer communications systems. Local area networks, packet-switched networks, routing algorithms, and performance. May not be applied toward a graduate degree in the School of Engineering and Applied Science. Prerequisite: EE 450 or permission of instructor. (As arranged)
- 452 Applications of Telecommunications Technologies (3)** Pickholtz and Staff  
Advanced topics and recent technological developments in telecommunications including traffic theory, switching systems, error detection and correction, cellular radio systems, and security and privacy in communications. May not be applied toward a graduate degree in the School of Engineering and Applied Science. Prerequisite: EE 451 or equivalent. (As arranged)

## COMPUTER SCIENCE

- 201 Introduction to Computer Systems (3)** Bock and Staff  
Programming digital computers in high-level and assembly languages. Architecture of traditional von Neumann and stack-based computers. Techniques in machine control and memory addressing. Number systems and codes. Software engineering. May not be taken for graduate credit by majors in computer science. Prerequisite: Pascal assembly language programming. (Fall and spring)
- 203 Microprocessor System Design (3)** Alexandridis and Staff  
Design of 16- and 32-bit microprocessor-based systems. Microprocessor, CPU, and system architecture. CPU and system buses and signals. Architecture support for pipelining, caching, interleaving, task switching, memory management, multiprocessing. Prerequisite: CSci 182 or permission of course director. (Fall and spring)
- 212 Discrete Analysis in Computer Science (3)** Berkovich and Staff  
Combinatorial theory: permutations and combinations, generating functions, recurrence relations, the principle of inclusion and exclusion, Polya's theory of counting, Block designs. Applications to the analysis of algorithms, computer



- organization, VLSI placement, coding theory, simulation, and other problems. Prerequisite: CSci 133 or permission of instructor. (Fall)
- 215 **Advanced Data Structures** (3) Berkovich and Staff  
Sparse matrix transpose and multiplication. List insertion and deletion, lists of available space. In-order, preorder, and postorder traversal of trees. Topological sorting. Binary search trees, including AVL trees, B-trees, and tries. Dynamic hashing. Prerequisite: CSci 133, 144. (Spring)
- 216 **Information Retrieval Systems** (3) Berkovich and Staff  
Information organization and retrieval of natural language data by digital computer systems, statistical, syntactic, and logical analysis of natural language; dictionary and thesaurus systems, searching strategies and cataloging. Large-scale file structures. Prerequisite: CSci 144 or permission of instructor (Spring)
- 217 **Computing Algorithms I** (3) Choi and Staff  
Design and analysis of basic classes of algorithms: divide-and-conquer, greedy, dynamic programming, tree and graph traversals, backtracking, branch-and-bound. Applications to problems such as sorting and searching, graph coloring, traveling salesperson, knapsack, and scheduling. Lower bound theory. NP-complete problems. Prerequisite: CSci 131, 144 (Fall and spring)
- 218 **Computing Algorithms II** (3) Youssef and Staff  
Graph algorithms, strongly connected components, biconnected components, dominators in acyclic graphs, ordered trees, network flow, planarity testing, bipartite matching, theory of NP completeness, NP-complete problems. Design and analysis of approximation algorithms for NP-complete problems. Prerequisite: CSci 217. (Fall and spring)
- 219 **Interactive Computer Graphics II** (3) Sibert and Staff  
Raster display system architecture and display technologies. Clipping and scan-conversion algorithms. Three-dimensional homogeneous coordinates and viewing. Visible-surface determination and shading models. Prerequisite: CSci 185, 217 or 258 (Spring)
- 220 **Pattern Recognition** (3) Loew and Staff  
Random vectors, transformations. Hypothesis testing, error probability, sequential methods, Bayes, other linear classifiers. Parameter estimation, learning, and dimensionality reduction. Nonparametric methods: clustering, feature selection and ordering. Syntactic methods: grammatical inference. Computer applications and projects. Prerequisite: EE 204. (Fall)
- 221 **Machine Learning** (3) Bock and Staff  
Learning as an alternative to rule-based schemes for artificial intelligence. Deterministic and probabilistic simulation of games. Markovian and bounded-context systems. The algorithmic process. Introduction to collective learning systems theory. Design, simulation, and evaluation of collective learning automata. Prerequisite: CSci 174, 232. (Fall)
- 222 **Design of User-Computer Dialogues** (3) Staff  
Design of dialogues for interactive systems. Psychological, physiological, linguistic, and perceptual factors. Advantages and disadvantages of various interaction techniques, command language syntaxes, and data presentations. Design methodology and guidelines. Case studies, research readings, and projects. Prerequisite: CSci 144 or permission of course director. (Spring)
- 224 **Artificial Intelligence** (3) Garcia and Staff  
Representation and space search. Heuristic search. Predicate calculus. Knowledge representation and knowledge engineering for expert systems. Rule-based, hybrid, and O-O systems. Semantic nets, frames, and natural language. Theorem provers. Overview of planning, learning, neural nets. Use of AI languages. Prerequisite: CSci 174, 232. (Fall and spring)
- 225 **Robotics Survey** (3) Bock and Staff  
Manipulator and sensor technology. Feedback loops and analog servos. Multiple degrees of freedom and coordinate systems. Joint-space-work-space transformations. Point-to-point continuous path control. Robot control: command language, navigation and mapping, collision avoidance. Distribution of intelligence. Adaptive hierarchical control. Prerequisite: CSci 174. (Spring)
- 227 **Management Information Systems and Database Management** (3) Rotenstreich and Staff  
Concepts in management information systems. Inverted files and query systems. Editing, report generation, updating, and updating load. Trade-off between direct

**access and indexed-sequential access. Construction of database management systems.** Conceptual and logical design of a database. Prerequisite: CSci 144 (Fall)

**228 Models of Intelligence (3)**

The central nervous system as a natural precedent for AI: structure and function of the neuron and neural networks, sensors and actuators, modular brain function. The cognitive process. Intelligence metrics. Genetics and self-organizing systems. Memory mechanisms. The psychological basis of learning and behavior. Prerequisite: CSci 174, 232. (Spring) **Bock and Star**

**229 Computer Security Systems (3)**

Techniques for security in computer systems. Authentication, logging, authorization, encryption, statistical inference controls. Effects of operating systems on machine architecture, countermeasures, risk-analysis systems. Computer course to EE 250. Prerequisite: CSci 144 or equivalent. (Fall) **Hoffman and Star**

**231 Sequential Machines (3)**

Finite-state sequential machine theory and design, state identification, information losslessness, state minimization in incompletely specified tables, partition theory, decomposition of machines, asynchronous machine design, structural simplicity, and design with ROMs and PLAs (planar logic arrays). Prerequisite: CSci 133, 182. (Fall, even years) **Friedman and Star**

**232 Automata and Formal Languages (3)**

Regular expressions. Turing machines, recursive functions, predicate calculus and computability. Formal language theory, including grammatical construction, recognizers, relationships between machines and grammars. Prerequisite: CSci 133, 140, 144. (Fall and spring) **Narahari and Star**

**\*235 Parallel Computer Architecture (3)**

Introduction to high-speed computer architecture. Parallel architecture, memory and I/O subsystems. Principles of pipelining and vector processing, pipeline computers and vectorization methods, examples of vector processors. Structure and algorithms for array processors. SIMD computers, interconnection networks, associative array processors. Prerequisite: CSci 182. (Fall) **Meltzer and Star**

**\*239 Comparative Computer Systems (3)**

Structures of computers and a system description language. History, characteristics, and philosophies of different computer structures. Special-purpose processors, multiprocessors, networks, and time-shared systems. Comparison of computer families. Performance evaluation. Effects of software and techniques on computer structures. Prerequisite: CSci 182. (Spring) **Youssef and Star**

**\*240 Theory and Practice of Microprogramming (3)**

Basic concepts, techniques, and theory of microprogramming. Microprogramming languages, assemblers, and hardware simulators, including specific applications of these to the design of current computer systems and their interfaces with real-time systems. Prerequisite: CSci 182. (Spring, even years) **Friedman and Star**

**243 Fault-Tolerant Systems (3)**

Fault-test generation for combination and sequential circuits, digital simulation as a diagnostic tool, design of easily tested and fault-tolerant systems. Prerequisite: CSci 182. (Fall, odd years) **Friedman and Star**

**244 Data Communications (3)**

Modems, multiplexers, concentrators. Line control procedures. Buffer management, message reassembly, queue control. Distributed processing; terminal-oriented systems, data-collection loops, multidrop lines. Switched data systems, circuit and packet switching. Error control, cryptosecurity. Prerequisite: CSci 144, 182, or permission of course director. (Spring) **Meltzer and Star**

**\*245 Computer System Performance (3)**

Queuing models of computer systems and applications of queuing theory to computer modeling. Bounds on system performance. Mean-value analysis of computer systems. Modeling specific subsystems. Queuing models for terminal-oriented systems, and batch processing. Prerequisite: CSci 237. (Fall) **Meltzer and Star**

**247 Languages for Systems Programming (3)**

Use of a macroassembler in structured programming. Conditional assembly. Design and programming of an assembler, macrogenerator, and loader. Prerequisite: CSci 120, 131. (Spring) **Maurer and Star**



- 255 Analysis and Correctness of Algorithms (3)** Maurer and Staff  
How to prove, mathematically, that a computer program properly satisfies its specifications. Correctness, partial correctness, termination, run-time errors. The inductive assertion method, verification conditions and their generation and proof. Applications to algebraic and assembly languages. Prerequisite: CSci 258. (Fall, even years)
- \*256 Design of Translators (3)** Feldman and Staff  
Introduction to programming language implementation. Overview of compilers, interpreters, and assemblers. Lexical analysis. Classical parsing techniques. Symbol tables and static semantic analysis. Code generation and run-time environments. Student-selected term project. Prerequisite: CSci 232, 258. (Fall)
- 258 Advanced Programming Languages (3)** Feldman and Staff  
Issues in modern programming languages. Data abstraction. Classical and experimental control structures. Exception handling. Portability and standardization of programming languages. Comparison of paradigms such as imperative, functional, and object-oriented, trade-offs between compiled and interpreted language. Prerequisite: CSci 133, 144. (Fall and spring)
- \*267 Operating Systems I (3)** Rotenstreich and Staff  
Operating systems for batch-oriented, multiprogrammed computer systems. Software components that constitute the operating system. Facilities of the macroassembler utilizing the operating system, loading and linking routines. Initializing programs and tasks, dispatching and the interrupt mechanisms. Performance evaluation. Prerequisite: CSci 215 or 217. (Fall)
- \*268 Operating Systems II (3)** Rotenstreich and Staff  
Processor management in a multiprocessor system, deadlocks, processor utilization, and I/O management. System availability and fail-safe mechanisms. Transaction-processing subsystems, memory management in a virtual memory system. Computer network software and the computer as a utility. Security and large database management. Prerequisite: CSci 267. (Spring)
- \*270 Software Engineering (3)** Rotenstreich  
The life-cycle model. Requirements and specifications. Design models, structured and object-oriented design. Program development, PDL, s tools, configuration control, Program, unit, and integration testing. Program verification. Other development models. Development metrics. Computer-aided software engineering (CASE). Prerequisite: CSci 217, 258. (Spring)
- 275 Design and Implementation of Educational Software (3)** Heller and Staff  
History and types of computer-based learning (CBL). Scripted and generative design strategies, authoring systems, data collection, operation of external apparatus, and artificial intelligence. Dissemination and legal issues. Models of learning theory. Case studies. Prerequisite: CSci 144. (Fall)
- 281 Numerical Solutions of Algebraic Systems (3)** Della Torre and Staff  
Numerical solutions of linear algebraic equations and the algebraic eigenvalue problem. Sparse matrix techniques. Solutions of nonlinear simultaneous equations. Multidimensional search algorithms. Interpolation and extrapolation. Prerequisite: CSci 155. (Fall)
- 282 Numerical Solutions of Ordinary Differential Equations (3)** Della Torre and Staff  
Numerical solutions of problems in one dimension. Calculus of finite differences in the derivation of the solution methods. Numerical quadrature; zeros of functions and zeros of polynomials, finite difference, predictor-corrector, and Runge-Kutta methods, boundary-value and eigenvalue problems of ordinary differential equations. Prerequisite: advanced calculus. (Spring, even years)
- 283 Numerical Solutions to Field, Wave, and Diffusion Problems (3)** Della Torre and Staff  
Finite difference, finite element, and boundary element methods. Eigen-function solutions. Boundary approximation. Graphical presentation of results. Convergence acceleration techniques. Prerequisite: CSci 281. (Spring, odd years)
- 285 Approximation of Functions and Data Representations (3)** Mentzer and Staff  
Review of linear spaces, least squares, orthogonal functions; nonlinear techniques, gradient search methods; parameter estimation with discrete data; Truncysheft approximation; approximation and curve fitting by spline functions and Bernstein polynomials. Prerequisite: CSci 155. (Fall, odd years)

- 297 Special Topics in Computer Science (1 to 3)**  
Topics to be announced in the *Schedule of Classes*. (Fall and spring)
- 298 Research (arr.)**  
Applied research and experimentation projects, as arranged. May be repeated for credit.
- 299-300 Thesis Research (3-3)**
- \*319 Interactive Computer Graphics III (3)**  
Parametric cubic curves and bicubic surfaces. Color models. Stochastic modeling. Computer animation, physically based image synthesis and motion control. Multiple-processor display system architectures. Window managers and user interface management systems. Current topics. Prerequisite: CSci 219. (Fall, even years)
- \*320 Computer Vision (3)**  
Image processing, edge detection, segmentation, local features, shape and region description in 2D and 3D. Insights from human vision. Representation for vision object models, synthetic images, matching, gaps, algorithms. Inference, production system, syntactic networks. Planning, spatial reasoning for robot vision. Prerequisite: CSci 220, 224. (Spring)
- \*321 Advanced Machine Learning (3)**  
Alternative memory structures. Selection and modification policies. Environmental models and evaluation policies. Metrics for performance evaluation. Collective learning systems automata. Self-organizing, hierarchical networks. Collective learning cells. Prerequisite: CSci 221, 224. (Spring)
- \*322 Natural Language Understanding (3)**  
The state of the art of natural language parsing and semantic understanding in computer systems. Review of formal, context-free, and transformational grammars and parsing. Augmented transition networks: problems of complexity semantics, and context. Deterministic parsing and semantic parsing. Prerequisite: CSci 224. (Spring)
- \*324 Knowledge-Based Systems (3)**  
The design, structure, and application of knowledge-based systems. Topics include: acquisition, representation, and processing of expert knowledge. Knowledge-based system architectures, development tools, and user interfaces. Surveys of existing knowledge-based systems. Student projects involve designing expert systems and development tools. Prerequisite: CSci 224. (Fall)
- \*327 Advanced Topics in Information Systems (3)**  
Special topics, such as architecture of information systems, organization of dynamic files, multidimensional search, user interfaces, and database machines. Students are encouraged to present reports in information systems research. Prerequisite: CSci 131 and one course chosen from CSci 215, 216, or 226, or permission of course director. (Fall, odd years)
- 329 Computer Security Systems II (3)**  
Advanced topics in information systems security. Intrusion detection, expert systems, viruses, advanced risk analysis methodologies, computer security models, computer network security, and statistical inference. Prerequisite: CSci 229. (Spring)
- 335 Advanced Computer Architecture (3)**  
Array processors, SIMD computers, performance enhancements, multiprocessor architecture, MIMD processors. Interconnection networks, memory organization, concurrency problems. Multiprocessing control algorithms, deadlock problems, synchronization, parallel algorithms, data flow computers. Prerequisite: CSci 235. (Spring)
- \*337 VLSI Systems Organization and Applications (3)**  
Impact of VLSI on computer systems design. Computational models for concurrent processing. Parallel algorithms. Concept of cellular automation. Process arrays. Associative processing. Computer communications. Redundancy and reliability. Specialized applications of VLSI systems. Prerequisite: CSci 214, 215, or equivalent. (Fall, even years)
- \*345 Advanced Computer System Performance (3)**  
Methods of performance evaluation, measurement techniques and tools. Simulation and simulation methods: analytical techniques, including analytical models. CPU-I/O overlap. Work-load characterization, artificial and synthetic work.



- loads. Evaluation of program performance. Prerequisite: CSci 245. (Spring, odd years)
- 358 Concurrency and Parallelism in Programming Languages (3)** Feldman and Staff  
Programming language models for the support of concurrency, parallelism, and distributed processing. Tasks and rendezvous, semaphores, synchronization, monitors, and message passing. Language support for distributed processing. Student projects. Prerequisite: CSci 250 or permission of instructor (Spring, even years)
- 390 Colloquium (0)** Lang and Staff  
Lectures by outstanding authorities in electrical engineering and computer science. Topics to be announced each semester. (Fall and spring)
- 391 Computer Science Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit

## ENGINEERING MANAGEMENT

Professors H.M. Steiner, R.C. Waters, H.B. Sewell (Chair), E.L. Murphree, Jr., B.G. Silverman, H. Eisner, J.E. Rasmussen  
Adjunct Professor J. Costantino  
Professorial Lecturers C.W. Fotis, L.H. Blakey, W.A. Goetz, I.R. Margulies, R.R. Romano, A.N. Konaratos, R.R. Blanchard, S.F. Pauls, H.S. Kimmel, H.J. Peake, L.M. Farrell, C.C. Myers, Jr., D.A. Wellman  
Associate Professors J.F. Dinwiddie, J.R. Harrauld, T.A. Mazzuchi  
Adjunct Associate Professors G.R. Brier, J.F. Patrick  
Associate Professorial Lecturers P.D. Rosenberg, V.R. Hayles, I.S. Raju, J.L. Pokorney, R.W. Doyon, D.S. Friedman, J.P. Deason, F. Allario, W.P. Henderson, J.C. Mathews III, P.E. Heartquist, I.E. Putnam, M.P. Clark, C. Alvord, R.B. Davis, J.E. Harris, S.A. O'Neill, I.D. Liveris, M.R. Habib, A.A. Moghadam, R.W. Witzel, J.L. Rogers, Jr., A.G. Cotterman, M.G. Goedde, A. Procko, W.L. Rodi, F.H. Stoodley, S.M. Wander  
Assistant Professorial Lecturers R.D. Hoffer, P.G. Meikle, F. Suber, Jr., T.P. Henry, L.F. Jackson, S.M. Janssen, A.J. Murray  
See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

- 204 Management of Engineering Contracts (3)** Goetz and Staff  
Study of the total contracting process (including initial budget preparation and justification, execution of a contract, and administration of the contract to completion) considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services. (Fall and spring)
- 207 The Personnel Function for Engineering Managers (3)** Fotis and Staff  
Principles, theory, and practical considerations of the personnel function for engineering managers, with applications for engineering management. (Fall)
- 210 Engineering Law (3)** Farrell and Staff  
Legal principles and procedures of interest to engineers. The American legal system, contracts and specifications, liability of professional engineers, product liability, agency relationships, patent and proprietary rights, special problems in research and development contracts. (Fall and spring)
- 211-12 Engineering Management I-II (3-3)** Sewell and Staff  
A comprehensive and systematic approach to management policies, principles, procedures, and practice. EMgt 211: Planning and organizing aspects of management. EMgt 212: Directing and controlling aspects of management. Prerequisite to EMgt 211: EMgt 150; prerequisite to EMgt 212: EMgt 211. (Fall, spring, and summer)
- 217 Fundamentals of Artificial Intelligence (3)** Silverman and Staff  
History of AI, knowledge representation, search and control techniques, natural language processing, computer vision, computer speech, robotics, expert systems, evidential reasoning, AI machines, and features of the LISP and PROLOG languages. Hands-on experience with LISP. Laboratory required. (Spring)

- 221 **Environmental Management** (3) Silverman and Staff  
Technical, economic, political, administrative, and social forces influencing the quality of the environment and the use of resources. Government and industry programs to combat pollution of the air, soil, and water. Legislation involving environmental and related energy matters, tools for assessing environmental impact. (Fall)
- 222 **Energy Management** (3) Silverman and Staff  
Conservation and management of the supply of and demand for energy resources, including petroleum, natural gas, coal, nuclear power, and unconventional forms. Topics include energy legislation, instruments for energy policy, and institutional barriers to new technologies in extraction, processing, and utilization. (Spring)
- 231 **Program Management** (3) Eisner and Staff  
Management science, the systems approach, and traditional managerial concepts applied to a variety of typical cases, such as technical programs and projects in government and industry. (Spring)
- 241 **Construction and Facilities Management I** (3) Murphree and Staff  
Types of construction procurement, aspects of contracts and specifications important to project management, subcontracting, project income, insurance bonds, mechanics' liens. (Fall and spring)
- 242 **Construction and Facilities Management II** (3) Murphree and Staff  
Administration of construction projects: planning, scheduling, control, resource allocation, and least-cost expediting (CPM and PERT techniques). Labor relations, project safety (OSHA). Laboratory required. (Fall and spring)
- 243 **Construction and Facilities Management III** (3) Murphree and Staff  
Application of quantitative models to construction management problems. Decision and risk analysis, applied probability concepts, bidding theory and practice, simulation of the construction process, queuing models, dynamic programming. Formulation and solution of quantitative models through the use of case studies. Laboratory required. (Fall and spring)
- 245 **Maintenance Management** (3) Waters and Staff  
Maintenance functions and the role of the technical manager in designing, supervising, and implementing maintenance programs. Topics include human aspects of maintenance, preventive maintenance, and computers in maintenance. Prerequisite: EMgt 211, 212, 269. (Fall)
- 251 **Management of Information Resources** (3) Dinwiddie and Staff  
Introduction to analysis, design, and implementation of on-line management information systems, including feasibility studies, requirements analysis, specifications, hardware and software considerations, performance evaluation, implementation plans, and postmortem considerations. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 253 **Production Management** (3) Waters and Staff  
Consideration of production operations in the context of an integrated company strategy. Process and trade-off analyses, capacity management and planning, technology planning. (Spring)
- 254 **Computer Systems in Information Management** (3) Dinwiddie and Staff  
Use of computers in information systems, with emphasis on accounting applications. Introduction to microcomputer analytical tools, logic of computers, hardware and software concepts, and data communications. Laboratory required. (Fall, spring, and summer)
- 255 **Management of Research and Development** (3) Waters and Staff  
Study of technological innovation as a vital part of the organizational adaptation process. Role of the technical manager in using organization planning and motivation to accomplish research and development objectives. (Fall)
- 256 **Survey of Information Systems** (3) Dinwiddie and Staff  
Information systems that provide support for management in areas such as finances, manufacturing, and marketing. Introduction to analysis of data, databases, and data communications. Laboratory required. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 261 **Economic Analysis in Engineering Planning** (3) Steiner and Staff  
Case studies in engineering economic planning, advanced problems in engineering economy. Prerequisite: EMgt 160 or an equivalent course in engineering economics, EMgt 269 or permission of instructor. (Fall and spring)



- 262 Finance for Engineers (3)** Waters and Staff  
Financial concepts encountered in engineering situations: financial statements, costing, inventories, profitability analysis, depreciation, credit, leasing, capital formation. (Fall)
- 265 Transportation Management I (3)** Waters and Staff  
Integration of social, technical, economic, and political considerations that shape transportation systems and their management. Focus on modal histories and relative advantages. (Fall)
- 266 Transportation Management II (3)** Waters and Staff  
Investigation of the economics and management of the airline industry from the U.S. and international perspectives. Topics include impact of deregulation and politics on the provision of air transportation. (Spring)
- 269 Elements of Decision Making and Problem Solving (3)** Murphree and Staff  
Concepts and quantitative techniques of the scientific method used in solving management problems. Role of decision criteria and subjective factors. Bayesian analysis. Value of information. Mathematical programming: linear, integer, and dynamic. Introduction to queuing theory. Prerequisite: EMgt 170 or equivalent. (Fall, spring, and summer)
- 270 Cooperating Expert Systems (3)** Silverman and Staff  
Human use of intuition, heuristics, parallel reasoning, and holistic analogies considered from a cognitive point of view. Students attempt to model expert human behavior and emulate it in a LISP-machine environment. Includes hands-on experience with expert-system tools, paradigms, and languages. Laboratory required. (Fall and spring)
- 281 Systems Analysis and Management I (3)** Eisner and Staff  
The systems or holistic approach as a methodology for making decisions and allocating resources. Analysis by means of objectives, alternatives, models, criteria, and feedback. Prerequisite: EMgt 269 or equivalent. (Fall)
- 282 Systems Analysis and Management II (3)** Eisner and Staff  
Case studies in systems analysis, including applications to industrial, economic, and military situations. Laboratory required. Prerequisite: EMgt 281 or permission of instructor. (Spring)
- 283 Systems Engineering I (3)** Eisner and Staff  
Systems approach, tools and techniques of systems engineering and applications to large software development. Prerequisite: EMgt 269; corequisite: EMgt 254 or equivalent. (Fall)
- 284 Systems Engineering II (3)** Eisner and Staff  
Further applications of systems engineering tools and techniques. Prerequisite: EMgt 283 or equivalent. (Spring)
- 285 Seminar: Management Problems (3)** Waters and Staff  
Individual analysis of complex administrative problems, with group evaluation and discussion. Prerequisite: 18 credit hours of graduate credit. (Fall and spring)
- 287 Decision Support Systems and Models (3)** Silverman and Staff  
Impact of human behavioral, managerial, and situational factors on choice of computer-based technique. Review of theory, languages, and methods in system modeling and artificial intelligence. Case studies. Laboratory required. (Fall and spring)
- 288 Technology Issue Analysis (3)** Eisner and Staff  
Contextual background and intellectual basis for addressing technology issues in the public and private sectors. Technology impact assessment, forecasting, and innovation; principles and practices of technology transfer as elements of a systematic approach to making technology decisions. (Fall)
- 290 Human Factors Engineering (3)** Staff  
Identifying human needs and human factors of common human-machine interfaces. Theoretical underpinnings of human factors and cognition; human reliability as information processors; case studies of successful human-machine interfaces. Hands-on experience in designing and evaluating interfaces. (Fall)
- 293 Technical Enterprises (3)** Eisner and Staff  
Essential features of technology-based companies from the entrepreneur's point of view. Team management of an enterprise in a computer-simulated environ-

- ment. Designed for those working in technical firms and for government personnel who depend on technical firms as suppliers. (Fall)
- 294 Marketing of Technology I (3)**  
Marketing industrial goods and high-technology projects, with special attention to the federal government as a market. Products, channels, pricing, promotion and personal selling as elements of strategy. (Spring)
- 295 Management of Databases and Technical Information (3)** Dinwiddie and Star  
Logical and physical structures of databases, record structures, transaction processing, access methods, inverted files. Traditional storage techniques, database management systems, relational databases, databases for computer-aided engineering. Laboratory required. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 297 Problems in Engineering Management (3)** Waters and Star  
Project course providing the opportunity to apply concepts and tools previously studied to the solution of a problem in engineering management. Students work individually or in small groups, each on a problem proposed by the student and approved by the instructor. (Fall, spring, and summer)
- 298 Research (arr.)**  
Basic or applied research in engineering management or systems analysis. Open to master's degree candidates in the department. May be repeated for credit.
- 299-300 Thesis Research (3-3)** Star
- 311 Marketing of Technology II (3)**  
Special attention to marketing research, negotiation, and international marketing. Required for master's degree candidates in the marketing of technology program. Prerequisite: EMgt 294 or permission of instructor. (Fall, even years)
- 321 Management Information Systems and Networks (3)** Dinwiddie and Star  
Advanced course in management information systems (MIS) with emphasis on technologies for making computer communication networks a reality. Traditional methodologies used in the development of MIS, introduction of computer communication networks and distributed data processing. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 344 Construction and Facilities Management IV (3)** Murphree and Star  
Construction methods and machinery. Examination of equipment available for construction, economics of equipment ownership, selection and management of optimum equipment for projects. Use of microcomputers for equipment simulation. Laboratory required. (Fall and spring)
- 370 Inventive Thought, Cognition, and Computers (3)**  
Human information process modeling, memory modeling, and normative vs. descriptive cognitive modeling, designing knowledge-based systems for computer-aided inventing. Cognitive models of inventors, project managers, and caseworkers are considered, adaptive knowledge-based systems, expert database systems, machine learning systems. Prerequisite: EMgt 270. (Spring)
- 386 Advanced Topics in Management (3)**  
Reading and discussion of classical and recent literature concerning the philosophy and application of management principles. (Fall, odd years)
- 387 Technological Forecasting (3)**  
Concepts and methodology: normative and exploratory forecasting, resource allocation and forecasting, technology transfer, technological change and its effects on forecasting, technology assessment. (Spring, even years)
- 388 Cost Effectiveness (3)** Stelner and Star  
Concepts of evaluation of engineered systems, current methods and trends in methodology, system resource requirements, probability and decision theory in cost-effectiveness studies, systems approach to cost-effectiveness studies. Prerequisite: EMgt 160 or equivalent. (Spring, even years)
- 390 Human-Computer Interaction (3)**  
Study of the psychological and behavioral aspects of users and their interactions with a computer. Emphasis is on the application of knowledge of these interactions to the design and development of a better human-computer interface. The focus is on human rather than computer issues. Prerequisite: EMgt 290 or permission of instructor. (Spring)
- 394 Advanced Study (arr.)**  
Limited to professional degree candidates in the department. May be repeated for credit.



**395-96 Professional Project Research (3-3)**

Limited to professional degree candidates in the department.

Staff

**398 Advanced Reading and Research (arr.)**

Limited to Doctor of Science candidates. May be repeated for credit.

Staff

**399 Dissertation Research (arr.)**

Limited to Doctor of Science candidates. May be repeated for credit.

Staff

**ENGINEERING SCIENCE**

See Civil, Mechanical, and Environmental Engineering.

**ENGLISH**

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz, J.A. Quitslund, C.W. Sten (Chair), D. McAleavey, C. Tate, O.A. Seavey

Associate Professors R.L. Combs, G. Carter, A. Romines, K. Moreland

Assistant Professors M.V. Dow, M.S. Soltan, J.L. Porter, C. Sponsler

Master of Arts in the field of American literature or Master of Arts in the field of English literature—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature above the sophomore level.

Required: the general requirements stated under the Graduate School of Arts and Sciences, including (1) 24 credit hours of course work planned in consultation with the department advisor; (2) Level One proficiency (translation of a passage with a dictionary) in an approved foreign language (French, German, Italian, Spanish, Greek, or Latin); (3) a Master's Comprehensive Examination in American or English literature; and (4) either a Master's thesis (6 credit hours) on an approved topic, directed by a member of the department's graduate faculty, or, with the approval of the department's director of graduate studies, 12 additional credit hours of course work in lieu of the thesis. Students must maintain a grade-point average of at least 3.25.

Doctor of Philosophy in the field of American literature or Doctor of Philosophy in the field of English literature—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature above the sophomore level.

Required: the general requirements stated under the Graduate School of Arts and Sciences, including satisfactory completion of (1) 72 credit hours of course work (48 for students with M.A. degrees in English) planned in consultation with the department advisor; (2) Level Two proficiency (translation of a passage without a dictionary) in an approved foreign language, or Level One proficiency (translation with a dictionary) in two approved foreign languages (French, German, Italian, Spanish, Greek, or Latin); (3) a qualifying examination in American literature or English literature (to be taken as soon as possible within the student's first 24 hours of course work) and a period or genre examination in the intended field of the dissertation; (4) a dissertation on an approved topic, directed by a member of the department's graduate faculty and approved by an examining committee.

Each student plans a program of studies in consultation with the department advisor and a committee of the graduate faculty. Students must maintain a grade-point average of at least 3.25. The fields for the period examination are English Medieval beginnings to 1500; English Renaissance: 1500-1660, English 18th Century: 1660-1800, Early American: beginnings to 1815, 19th-Century English and or American: 1800-1900, and 20th-Century English and or American: 1900 to the present. The fields for the genre examination are drama, prose fiction, poetry, and criticism.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs section for course listings.

**EXPOSITORY WRITING****201 Modern Theory of Rhetoric (3)**

The rediscovery of rhetoric in 20th-century criticism and pedagogy. Rhetorical orientations toward language: cultural and intellectual contradictions that

Porter, Dow

shape the practice of contemporary rhetoric; theories and methods of teaching composition. (Fall)

202 **The History of Rhetoric (3)**

Formative theories of discourse developed during the Greco-Roman period and disseminated during the Renaissance and early modern period. The political and philosophical context in which rhetoric was developed in fifth-century Athens. Later Roman and European codifications. (Spring)

**ENGLISH AND AMERICAN LITERATURE**

212 **Studies in Chaucer (3)**

A view of Chaucer's works as responding to pressing epistemological, social, and moral crises of the late medieval period and, at the same time, as presenting readers with seemingly irresolvable problems of interpretation. (Fall)

219 **Introduction to Graduate Studies in English (3)**

For all candidates for M.A. and Ph.D. degrees in American or English literature. Introduction to the scope and methods of advanced literary studies; readings, research problems, and instruction designed to acquaint students with available aids to research. (Fall)

223 **Contemporary Literary Theory (3)**

Inquiry into the nature of literary texts and interpretive strategies. Close readings of texts (by Barthes, Derrida, de Man, Bloom, Eagleton, Fish, Kermode, and others) exemplifying the ferment of recent theoretical writing about literature. (Fall)

226 **Studies in Renaissance Verse and Prose (3)**

Investigation of broad topics central to literature of the Renaissance (e.g., development of the lyric, heroic poetry and romance, literature and the court, with primary attention to English texts and some attention to classical and continental contexts. (Fall)

227-28 **Studies in Shakespeare and his Contemporaries (3-3)**

Specialized studies of Elizabethan and Jacobean drama, considered in its cultural context, with emphasis on Shakespeare. (Fall)

230 **Studies in Milton (3)**

(Fall)

232 **Studies in English Literature, 1660-1780 (3)**

233-34 **Studies in the Romantic Movement (3-3)**

Intensive and contextual consideration of English Romantic writers, themes, genres. Topics will vary (e.g., Byron and Romantic irony, Wordsworth and Keats, defining Romanticism, Romanticism and childhood. (Fall)

235 **Studies in Victorian Poetry (3)**

Investigation of various ways in which the major Victorian poets depended upon and departed from the achievements of precursors among the Romantics and earlier poets. (Fall)

236 **Studies in Victorian Prose (3)**

Study of seminal writings by such authors as Carlyle, Mill, Arnold, Newman, Darwin, and Pater, with attention to both their intrinsic merit and the light they throw on Victorian poetry and fiction. (Fall)

237-38 **Studies in 20th-Century Literature (3-3)**

251 **Women, Literature, and the Arts (3)**

Same as WStu 251. (Fall)

253-54 **Seminar: The English Novel (3-3)**

Investigation of various topics concerning the development of the genre, 18th to 20th centuries: e.g., themes and form in 18th-century fiction; emergence of circumstantial realism; mentors and lovers in 19th-century novels; the revolution in fictional forms circa 1900. (Fall)

263-64 **Seminar: American Poetry (3-3)**

American poets and critics of poetry. (Fall)

267-68 **Seminar: American Fiction (3-3)**

Investigation of various topics pertinent to the American novel and short fiction, primarily of the 20th century (e.g., Faulkner, experimental fiction, writers of the Midwest). (Fall)

282 **Seminar: Early American Literature (3)**

(Spring)



- 283-84 **Seminar: American Romanticism** (3-3) Sten  
Engl 283: American Romance writers Melville Hawthorne Poe, and others Engl  
284 American Transcendentalist poetry Emerson, Whitman, Dickinson, and  
others
- 285-86 **Seminar: American Realism, 1865-1915** (3-3) Romines  
Realistic fiction in various contexts—literary, intellectual, cultural. Major au-  
thors, such as James, Twain, Howells, and Wharton, are included, along with  
other writers, such as Jewett, Chopin, Norris, and Adams. Topics vary e.g. the  
autobiographical impulse, influence of French fiction and criticism, the impor-  
tance of "place," the significance of gender
- 287 **O'Neill and Modern American Drama** (3) Combs  
Study of the career of Eugene O'Neill and his impact on the development of  
modern theater in America, readings in biography and criticism (Fall)
- 295 **Independent Research** (3) Staff  
Written permission of instructor required. May be repeated for credit to a maxi-  
mum of 9 hours
- 299-300 **Thesis Research** (3-3) Staff  
301-14 **Folger Institute Seminars** (3 each) Staff  
Topics will be announced in the *Schedule of Classes*. May be repeated for credit  
provided the topic differs. Consult the chair of the department before registration.
- 398 **Advanced Reading and Research** (arr) Staff  
Limited to students preparing for the Doctor of Philosophy general examination.  
May be repeated for credit
- 399 **Dissertation Research** (arr) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## ENVIRONMENTAL AND RESOURCE POLICY

### Committee on Environmental and Resource Policy

H. Merchant (Director), J. Millar, H. Vandermer, A. Viterito

The Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Arts in the field of public policy with a concentration in environmental and resource policy. The program is directed by the Committee on Environmental and Resource Policy and draws upon faculty and relevant courses from the various departments within the University.

The Environmental and Resource Policy Program presents in its core requirement a graduate-level examination of the specific areas that affect decisions made in the broad area of environmental and resource policy. This material includes the analytic tools required for decisions leading to effective policy regarding the environment and natural resources. In addition to mastering the core material, a student is also expected to develop specific competence in an area of particular interest by choosing an approved elective field. Prospective candidates should consult with the director of the Environmental and Resource Policy Program.

**Master of Arts in the field of public policy with a concentration in environmental and resource policy.**—Prerequisite: a bachelor's degree with a B average (or equivalent) in a social science, natural science, or other relevant area from an accredited college or university and an introductory course in statistics

**Required:**  
(a) The general requirements stated under the Graduate School of Arts and Sciences.  
(b) Twenty-six hours of core courses selected from the following (students whose backgrounds include some of these courses may substitute additional courses in the field): BiSc 208, 243, Econ 217, 247, EnE 240, E&RP 210, PSc 203, PAD 205, Stat 210 or other appropriate statistical techniques course)

Twelve hours of courses selected from those listed in one of the following elective areas. Check the Undergraduate Programs Bulletin for 100-level courses  
Social Sciences: Geog 107, 108, 136, 137, 219; Geol 105, 122, 128, 131, 175  
Geography: BiSc 140, 141, 142, 143, 144, 150, 167, 206, 242; Geog 290  
Economics: Econ 235; EMgt 221; Geog 134; PSc 222, 223, 252, 288, 289 (the School of Management and Applied Science offers many courses relevant to this area; some may be selected in this program)

Environmental Management: Econ 161, 162; Geog 132, 133, 222, 230, 290; Soc 127

(d) **Comprehensive Project**—Undertaken at the completion of the student's program the comprehensive project is the investigation of a specific problem in environmental and resource policy and the development of a proposed solution in a manner that integrates the core curriculum with the course work in the elective field.

**210 Seminar in Environmental and Resource Policy (3)**

Limited to candidates in the Environmental and Resource Policy program; capstone course integrating the core and elective areas of the program. Provides practical experience in decision making and serves as preparation for the comprehensive project.

## ENVIRONMENTAL SCIENCE

### Committee on Environmental Science

H. Merchant (Director), J. Millar, H. Vandermer, A. Viterito

The Graduate School of Arts and Sciences offers a multidisciplinary program leading to the degree of Master of Science in the field of environmental science. The curriculum is designed to provide an understanding of the environment with an emphasis on problems at the work place.

**Master of Science in the field of environmental science**—Prerequisite: a bachelor's degree with a B average from an accredited college or University and an introductory course in statistics.

**Required:**

- (a) The general requirements stated under the Graduate School of Arts and Sciences.
- (b) Thirty hours of core courses: Chem 205; Econ 217, 237; EnHe 201, 240, 256, 270, 301; PSc 222; Stat 127.
- (c) Six hours of additional course work selected in consultation with the advisor.
- (d) **Comprehensive Project**—Undertaken at the completion of the student's program the comprehensive project is the investigation of a specific problem in environmental health and the development of a proposed solution in a manner that integrates the core curriculum with the elective courses.

## ENVIRONMENTAL HEALTH

**201 Introduction to Epidemiology (3)**

Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology.

**240 Environmental Impact Statement Procedures and Environmental Law (3)**

The rationale for environmental impact statements from the viewpoint of the nature and origins of environmental concerns. Government agencies responsible for environmental impact statements; current statutes and regulations pertaining to the environment.

**256 Introduction to Environmental Health (3)**

Organizations, functions, current practices, and regulations at all levels to control the environment. Economic impact upon society and industry in carrying out control and preventive practices.

**270 Industrial Hygiene (3)**

Industrial health hazards: chemical exposure to toxic dusts, metallic fumes and vapors, gases, and organic compounds; physical hazards such as high- and low-temperature biological effects, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and particulate pollution; prevention and control of industrial health hazards.

**301 Applied Epidemiology and Environmental Health (3)**

Lectures, seminars, and case studies. Epidemiological solutions to health problems of the community.



Professors F. Amling, T.M. Barnhill (Chair), W.E. Seale, W. Handorf  
Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Peyser, M.S. Klock  
Assistant Professors S.B. Jenkins, G.M. Jabbour, M. Humber (Visiting)

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

**220 Business Financial Management (3)**

Klock, Jabbour, Handorf

This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Theory, policy, and practice in financial management; financial analysis, sources of funds, investing, capital planning, and budgeting. Prerequisite: Accy 201, Econ 217, Mgt 218 and 270, or equivalents. (Fall and spring)

**221 Financial Decision Making (3)**

Sachlis, Peyser

Theory and practice of business finance, emphasizing the impacts of long- and short-term uses and sources of funds on the firm's value. Prerequisite: Fina 120 or 220. (Fall and spring)

**222 Capital Formation (3)**

Jenkins, Handorf

Determinants of saving and investment and resultant funds flow are evaluated. Special emphasis on the level and risk structure and term structure of interest rates. The role and management of financial institutions is stressed. Prerequisite: Fina 120 or 220. (Fall and spring)

**223 Investment Analysis and Portfolio Management (3)**

Amling, Cohen, Klock

Risk-reward analysis of security investments, including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: BAD 120 or 220. (Fall and spring)

**224 Financial Management (3)**

Cohen

Advanced case studies in financial management; working capital policy, capital budgeting, financing with debt and equity, dividend policy, and valuation. Prerequisite: Fina 221. (Fall and spring)

**225 Economic, Social, and Legal Aspects of Real Estate Development (3)**

Fuller

Same as UPRE 225.

**226 Financing Real Estate Development (3)**

Staff

Same as UPRE 226.

**227 Problems in Real Estate Development (3)**

Staff

Same as UPRE 227.

**228 Real Estate Development Planning and Design (3)**

Greene

Same as UPRE 228.

**231 Seminar: Investment and Portfolio Management (3)**

Amling

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: Fina 223. (Fall)

**233 Futures Markets: Trading and Hedging (3)**

Barnhill, Seale

Organization and regulation of futures markets. Alternative strategies for trading of futures contracts for possible hedging uses. High risk-high return investment alternatives. The use of futures markets to manage risks. Prerequisite: Introductory courses in economics, statistics, computer usage, and financial management. (Fall and spring)

**237 Personal Financial Advising (3)**

Cohen

For students preparing to be personal financial advisors; the combination of taxes, pensions, investing, budgets, estates and trusts, and insurance into comprehensive personal financial plans. Regulation, professional ethics, and the economics of advisor firms are also covered. Extensive use of computer spreadsheets and case studies. Prerequisite: Fina 221, 223, Accy 261. (Spring)

**239 Financial Theory (3)**

Peyser, Klock

In-depth theoretical analysis of financial topics, including asset management, financial structure, dividend policy, and the capital asset pricing framework. Prerequisite: Fina 221, 223.

- 290 Special Topics (3)**  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 298 Directed Readings and Research (3)**
- 299 Thesis Seminar (3)**
- 300 Thesis Research (3)**
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)**  
Same as SMPP 311.
- 321 Seminar: Financial Markets (3)**  
Research seminar in corporate finance, investments and financial markets. May be repeated once for credit. Prerequisite: Fina 222, 231, 239.
- 398 Advanced Reading and Research (arr.)**  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)**  
Limited to doctoral candidates. May be repeated for credit.

### FORENSIC SCIENCES

Professors T.P. Perros, J.E. Starrs, T.F. Courtless, Jr., C. O'Rear (Chair), W.F. Rowe  
Adjunct Professor C.G. McWright  
Professorial Lecturers L.R. Goldbaum, E.G. Howe, C.E. Bohn, K.E. Melson, R.C. Moran  
Associate Professor N.T. Lappas  
Associate Professorial Lecturers W.A. Bayse, S.R. Lorigo, R.E. Easton, G. Epstein, H. Samway, S.S. Sohn, D.G. Wright  
Assistant Professorial Lecturers L. O'Grady, S.W. Bentley, J.R. Carlon, W.E. Clancy, L. Lee II, S.J. Cribari, J.T. Martin, J.J. Conway

**Master of Forensic Sciences**—Prerequisite: a bachelor's degree from an accredited institution of higher learning and academic or professional experience in the behavioral, biological, or physical sciences or in law, medicine, or law enforcement.

Required: the general requirements stated under the Graduate School of Arts and Sciences. Students must complete 36 credit hours of approved course work (students approved for a thesis must complete 30 credit hours of course work plus a thesis (equivalent to 6 credit hours). ForS 220, 221, 224, and 225 are required of all students. ForS 224 may be waived for students having an LL.B. or J.D. degree from an accredited law school. The following are also required: (1) 9 hours selected from ForS 201, 202, 203, 204, and 205; (2) 6 hours selected from ForS 214, 260, 261, 265, and 269; (3) the remaining credit hours must be selected in consultation with the advisor from the behavioral sciences, law, management science, or forensic sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

**Master of Forensic Sciences with a concentration in forensic molecular biology**—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited university or university.

Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of studies consists of 40 credit hours of approved course work. Bioc 221-22, 250; BiSc 229 or ForS 201, BiSc 228, 230, 274, 275, ForS 295, Micr 229 and Stat 127 are required of all students. The remaining required hours are electives chosen in consultation with the advisor. The Bioc 221-22 requirement may be waived if equivalent courses have been taken within the last two years as a part of a graduate degree program. Each student must participate in a departmental seminar in forensic molecular biology each semester. All candidates are required to pass a written Master's Comprehensive Examination.

**Master of Science in the field of chemical toxicology**—Prerequisite: completion of the first three years of the combined B.S.-M.S. program in chemical toxicology (see Chemistry Department) or its equivalent. Courses may be required to remove academic debt.

Required: the general requirements stated under the Graduate School of Arts and Sciences. The following courses are required: Bioc 221-22, Phyl 191, Phar 203, ForS 245, and 242 or 270, two courses selected from ForS 246, 248, 249, 269, ForS 299-300, Chem 299-300, Chem 134, 141-42, and Stat 127 will be required of students who have not had these courses or their equivalent. All candidates are required to pass a Master's Comprehensive Examination.



**Bachelor of Science/Master of Science in the field of chemical toxicology**—A five-year program leading to the B.S. in the field of chemistry and M.S. in the field of chemical toxicology. The first three years of the program consist of undergraduate course work. (See the Undergraduate Programs Bulletin.) Application for admission to the M.S. program in chemical toxicology will be made to the Graduate School of Arts and Sciences during the second semester of the third year, for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance into the M.S. program in chemical toxicology is not desired or not obtained, the requirements for the B.S. B.A. in chemistry, either Major I or II, may be fulfilled by the successful completion of appropriate courses during the fourth year of study. If acceptance into the M.S. program in chemical toxicology is obtained, the B.S. in chemistry will be awarded after the successful completion of the fourth year of the program.

The following requirements must be fulfilled.

1. Students must meet the general requirements stated under Columbian College of Arts and Sciences and the Graduate School of Arts and Sciences.
2. **Course requirements:** Chem 11-12, 22 and 23, 111-12, 113, 122, 123, 141-42, 151-52, 153-54, 235; Phys 21-22; BiSc 11-12, Math 31, 32, Stat 127 and a course in a structured computer programming language; Phar 203, Bioc 221-22, Phyl 191, ForS 240, 245 and 242 or 270, either ForS or Chem 299-300, and two courses chosen from ForS 246, 248, 249, 269.

**Master of Science in Forensic Science**—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited college or university.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of 30 credit hours of course work, plus a thesis equivalent to 6 (credit hours). Individualized programs of study will be developed to meet the career objectives of each student. Students may specialize in forensic chemistry, toxicology, or serology. Each such program of study must include ForS 224 and 225. All candidates must also participate in the departmental seminar each semester. The remaining credit hours must be selected from approved courses in the forensic sciences, biological sciences, management science, law, or basic medical sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

**Master of Arts in the field of criminal justice**—Prerequisite: a bachelor's degree from an accredited college or university.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work in the forensic sciences, law, criminology, management science, sociology, and psychology. ForS 224, 220, 221, 224, 225, 228, 265, 266, 274, 290, and Soc 259, 261 are recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

**Master of Arts in the field of criminal justice with a concentration in crime in communities**—Prerequisite: a bachelor's degree from an accredited college or university.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work drawing upon the forensic sciences, law, accounting, computer science, investigative techniques and management. ForS 203, 224, 225, 229, 232, 233, 234, 235, 251, 267, 274, and Stat 197 are recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

**Master of Arts in the field of criminal justice with a concentration in security management**—Prerequisite: a bachelor's degree from an accredited college or university.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. Students must complete 36 credit hours of approved course work, students are required to complete a thesis (equivalent to 6 credit hours). The program of study consists of course work drawing from the forensic sciences, law, criminology, management science, investigative techniques, and security management. Courses are selected from ForS 214, 224, 229, 232, 233, 234, 252, 254, 256, 266, 267, 290, 295, Soc 263. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences management practicum.

The interdisciplinary programs leading to the degrees of Master of Arts, Master of Forensic Sciences, and Master of Science in Forensic Science may include course work from the School of Business and Public Management, the National Law Center, the School of Medicine and Health Sciences, and graduate course work in the behavioral, biological, and physical science departments of the University. Students work closely with their advisors in setting up a program that meets their interests, needs, and background knowledge. The Department of Forensic Sciences is affiliated with the Armed Forces Institute of Pathology and with the Council of Higher Education, Commonwealth of Virginia, in programs of mutual exchange of students, courses, and facilities. For further information, contact the Department of Forensic Sciences.

A research field in forensic chemistry is available in the Ph.D. program in the Chemistry Department.

- 201 Forensic Serology I (3)**  
Principles of the forensic analysis of blood and other biological materials. Specific procedures and techniques used in forensic serology. Laboratory exercises. Lappas, Rowe
- 202 Instrumental Analysis (3)**  
Principles and application of various instrumental methods to the examination of criminal evidence, including chromatographic and spectrophotometric techniques and mass spectrometry. Laboratory exercises. Perros, Rowe
- 203 Examination of Questioned Documents (3)**  
Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture and fiber analysis; studies of paper and methods of examination of questioned documents. Laboratory exercises. Bohn, Epstein
- 204 Firearms and Toolmark Identification (3)**  
Methods for identifying firearms, cartridge casings, toolmarks, tire marks and footprints. Laboratory exercises. Rowe
- 205 Personal Identification (3)**  
Methods of personal identification based on sketches, fingerprints, voiceprints, odontology, and study of skeletal remains. O'Rear, Rowe
- 214 Forensic Psychiatry (3)**  
Introduction to the constructs of dynamic psychiatry, psychiatric treatment, and the nomenclature of mental disorders. Consideration of expert testimony, direct examination, and cross-examination in hospitalization and criminal cases. Howe, Manton
- 220 Physical Aspects of Forensic Sciences (3)**  
Survey of forensic physical sciences; fingerprints, firearm and toolmark examinations, document examinations, and examinations of trace evidence, such as glass, soil, paint, hairs, and fibers, crime scene investigations; qualifications and preparation of expert witnesses; operation and functioning of the forensic sciences laboratory. O'Rear, Rowe
- 221 Biological Aspects of Forensic Sciences (3)**  
Principles of forensic pathology, serology, and toxicology. The role of the forensic laboratory in the identification of human remains; determination of the time, cause, and manner of death; partial individualization of biological materials; and the detection of drugs in biological materials. Lappas, Rowe
- 224 Criminal Law I (3)**  
Principles of criminal law and procedure, preparation and presentation of evidence, examination of witnesses, and methods of legal research. Clancy, Melson, O'Grady
- 225 Criminal Law II: Evidence (3)**  
Procedural rules affecting the collection and use of physical evidence, emphasis on court opinions defining the rules of search and seizure and admissibility of evidence. Prerequisite: ForS 224. Melson, O'Grady
- 227 Criminal Law III: Procedure (3)**  
Decision to arrest, prosecutive discretion, bail, the preliminary hearing, speedy trial, discovery, plea bargaining, publicity, postconviction procedures. Prerequisite: ForS 224. Melson, O'Grady
- 229 Criminal Law IV: Contracts (3)**  
Concepts and principles of law encountered in commercial activities: contracts, sales, negotiable instruments, and bankruptcy. Emphasis on recognition of deceptive contracting practices. Statutes and government regulation governing contracts. Foster



- 232 **Crime in Commerce I: Accounting** (3) Lorigo  
Principles of accounting; abuse and misuse of accounting procedures; use of accounting in the investigation of commercial crime.
- 233 **Crime in Commerce II: Procurement and Supply** (3) Bentley, Lorigo  
Governmental and private-sector procurement procedures, techniques of inventory management, abuse of procurement procedures and illicit diversion of supplies.
- 234 **Crime in Commerce III: Information Systems** (3) Bavse  
Principles of management information systems; security of information systems and facilities; compromising of information systems.
- 235 **Crime in Commerce IV: Conspiracy** (3) Lorigo  
Legal definition of conspiracy; quantum of proof, use of investigative techniques to establish the existence of criminal conspiracies.
- 240 **Principles of Toxicology** (4) Lappas  
Concepts of toxicology, including its historical development and modern applications, drug disposition, mechanisms of toxicity, factors that influence toxicity and toxicity evaluation. Prerequisite: Phar 203 or permission of instructor.
- 242 **Chemistry of Organic Medicinal Agents** (3) O'Rear  
A correlated study of the composition, constitution, physical and chemical properties, and pharmaceutical uses of organic medicinal agents. Included are discussions of the heterocyclic chemistry of these agents.
- 245 **Analytical Toxicology** (4) Lappas  
A study of qualitative and quantitative principles and procedures used in the detection, identification, isolation, purification, and potency determination of drugs. Laboratory.
- 246 **Environmental Toxicology** (3) Lappas  
A study of the chemical substances to which humans are unintentionally exposed. Emphasis will be placed on pesticides, food additives, and air pollutants.
- 248 **Clinical Toxicology** (3) Staff  
A study of the adverse effects caused by or related to the use of drugs. The signs and symptoms, diagnoses, and treatments will be emphasized.
- 249 **Industrial Toxicology** (3) Staff  
A study of the potential hazards encountered by workers as a result of their exposure to raw materials, intermediates, and finished products. The types of exposure and methods of predicting and preventing toxic exposure will be emphasized.
- 250 **Interdisciplinary Aspects of Forensic Science** (3) Carlson, O'Rear  
Scientific and legal aspects of current concepts. Includes qualification as an expert witness, chain of custody, impact of testimony on the jury, admissibility of evidence, class evidence vs. individualized evidence, and search and seizure. Prerequisite: ForS 224.
- 251 **Moot Court** (3) Cribari, Martin  
Students prepare and present direct testimony and are cross-examined by an experienced trial attorney in simulated courtroom setting. Class discussions of problems, techniques. Lectures on discovery, admissibility of scientific evidence, chain of custody, use of notes, etc. Prerequisite: ForS 224.
- 252 **Topics in Security Management** (3) Lee  
The broad spectrum of factors that shape modern security management: technology, government regulations and policies, corporate matters, information systems, legal principles, international programs, congressional committees, industrial organizations, associations. Potential areas of research and study.
- 254 **Selected Topics in the Forensic Sciences** (3) O'Rear  
Current issues in research, investigation, and law.
- 255 **Security Management I** (3) Lee  
Risk assessment and management, redundant security systems, cost-benefit analysis. Administration of personal, industrial, and physical plant security.
- 256 **Security Management II** (3) Lee  
Hostage situations, preparation of high-risk employees and spouses for hostage incidents, management of post-incident situations, hostage rescue groups.
- 257 **Management of Security Organizations** (3) Conway  
Theories of management, with emphasis on leadership and interaction of individuals, groups, managers, and the organization as a whole. Discussions centered

- on organizations with security responsibilities, including government agencies, corporate entities, and the military.
- 260 Principles of Forensic Medicine (3)** Sohn, Wright  
Anatomy and physiology of the human body, with emphasis on understanding the processes underlying traumatic and unexpected deaths encountered in forensic pathology. Bone growth and repair as it relates to child abuse, structure and functions of the heart as related to sudden death, and anatomic area of the brain prone to hemorrhagic lesions following trauma.
- 261 Principles of Forensic Pathology (3)** Sohn, Wright  
Terminology and scientific techniques used in medico-legal investigations of sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma.
- 265 Drugs of Abuse (3)** Lappas, O'Rear  
Chemical, pharmacological, toxicological, and pathological characteristics of commonly abused drugs, including ethanol, barbiturates, narcotics, stimulants, and hallucinogens. Primarily for M.A. degree candidates; open to others with permission of instructor.
- 266 Seminar: Modern Trends in Criminal Justice (3)** O'Rear, Courtless  
Recent advances in criminal justice. Discussions incorporate several disciplines including science, law, management, social sciences, and psychology.
- 267 Seminar: Crime in Commerce (3)** Longo  
Interdisciplinary course in current problems in the investigation and prosecution of commercial offenses.
- 268 Photography in the Forensic Sciences (3)** Wright  
Basic use of forensic photography, including selection and use of equipment, photographs as evidence, close-up work, and common misconceptions. Laboratory fee, \$35.
- 269 Forensic Toxicology I (3)** Lappas  
Relevant underlying biological, chemical, and pharmacological principles of forensic toxicology.
- 270 Medicinal Chemistry (3)** O'Rear  
Theory and principles of classification, synthesis, and structure activity relationships of drugs. Discussion of the complex chemical events that take place between administration of a drug and its action on the user, with emphasis on drugs of abuse.
- 271 Forensic Serology II (3)** Lappas  
Methods in forensic serology. Laboratory examinations and classifications of dried blood and other biological materials. Independent laboratory projects. Laboratory fee, \$35. Prerequisite: ForS 201 or permission of instructor.
- 272 Forensic Toxicology II (3)** Lappas  
Lectures, student seminars, laboratory exercises, and projects dealing with topics of current interest in forensic toxicology. Prerequisite: ForS 245 or 269 or permission of instructor. Laboratory fee, \$35.
- 273 Forensic Chemistry I (3)** Row  
Examination of glass, soils, hairs, and fibers. Laboratory exercises include refractive index measurements using immersion methods, polarized light observations of minerals, x-ray diffraction analysis of minerals, and classical chemical and physical methods of analysis. Prerequisite: ForS 202 or permission of instructor. Laboratory fee, \$35.
- 274 Management of Criminal Justice Organizations (3)** O'Rear  
Theories of management with emphasis on leadership. Interaction of individuals, groups, managers, and the organization as a whole. Discussions center on the criminal justice system.
- 280 Forensic Chemistry II (3)** Row  
Examination of arson accelerants, textile fibers, plastics, and paints. Laboratory exercises include infrared spectrophotometry and pyrolysis—gas—liquid chromatography of polymeric materials, as well as classical chemical and physical methods of analysis. Prerequisite: ForS 273. Laboratory fee, \$35.
- 290 Research in Criminal Justice (3)** Courtless, Schlougel  
An examination of the role and process of research as it serves the criminal justice system. Presentations and discussions of the literature with emphasis on the use of research and analysis in formulating and evaluating criminal justice policies.



**295 Research (arr.)**

Open to qualified master's degree students. Research on problems approved by the department chairman or academic advisor, under the supervision of an appropriate staff member. Staff

**297 Security Management Practicum (1)**

Open to qualified master's degree students. Internship experience in an agency or corporate unit with security responsibilities, under the supervision of an appropriate staff member. Students must preregister for the course. Credit for the course cannot be used toward the 36 credit hours required for the master's degree. O'Rear

**298 Forensic Sciences Practicum (1)**

Open to qualified master's degree students. Internship experience in a forensic science laboratory or criminal justice agency, under the supervision of an appropriate staff member. Students must preregister for this course. Credit for the course cannot be used toward the 36 credit hours required for the master's degree. O'Rear

**299-300 Thesis Research (3-3)**

Staff

**GENETICS****Committee on Genetics**

S.O. Schiff (Director), S.L. Adhya, W.F. Anderson, J. Brady, K.M. Brown, D.J. Brusick, J. Chou, C. Clawson, R.G. Crystal, R.F. De Giovanni-Donnelly, D.D. Derse, W. Drohan, R.C. Gello, C.T. Garrett, D. Goldman, G. Hager, B.H. Howard, L.W. Hover, V.W. Hu, D.E. Johnson, A.A. Kennedy, R.L. Kincaid, P.D. Kind, A.M. Kruisbeck, A. Kumar, J.W. Larsen, W.M. Leach, J. Leonard, R. Mage, K.H. McKenney, C.R. Merrill, T.W. Moody, D. Morris, S. O'Brien, S. Paterno, J.C. Petruciani, U.R. Rapp, K.N. Rosenbaum, B. Safer, J. Schlom

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of genetics. This program is directed by a committee whose members are drawn from the Departments of Biochemistry, Biological Sciences, Microbiology, Obstetrics and Gynecology, Pathology, and Pharmacology and from government agencies and private industry.

Requirements for admission are stated under the Graduate School of Arts and Sciences. The undergraduate program must have included the following: 8 credit hours each in biology, inorganic chemistry, and organic chemistry; 6 credit hours in physics; 6 credit hours in English composition and literature; one course in at least two of the following areas: genetics, cell biochemistry, cell or molecular biology.

**Master of Science in the field of genetics—Required:** the general requirements stated under the Graduate School of Arts and Sciences. The 30 credit hours required in this program must include Gnet 201 and Gnet 299-300. The remaining 22 credit hours of elective work are to be selected, with the approval of the Committee on Genetics, from the interdepartmental courses listed below.

**Doctor of Philosophy in the field of genetics—Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study must include Gnet 201, 8-10 credit hours of biochemistry, 6-8 credit hours of cell biology, 10-12 credit hours of genetics, and 3 credit hours of statistics. These courses may be selected from the interdepartmental listings below. (Course descriptions are listed under the department concerned, except for 100-level courses, which are listed in the Undergraduate Programs section.)

**201 Advanced Problems in Genetics (2)**

Lectures on selected topics by members of the Committee on Genetics. Required of all master's degree candidates in the Genetics Program. Prerequisite: degree candidacy or permission of program director. (Fall) Staff

**256 Biochemical Genetics and Inherited Metabolic Diseases (2)**

Biochemical aspects of genetics and contributions of molecular biology to understanding of human mutations and hereditary diseases. Prerequisite: degree candidacy or permission of program director. (Spring) Merrill

**295 Research (arr.)**

Open to qualified master's degree students. Research on problems approved by the Committee on Genetics. May be repeated for credit. (Fall and spring) Staff

**299-300 Thesis Research (3-3)**

**301 Advanced Problems in Genetics (2)**

Lectures on selected topics by members of the Committee on Genetics. Required of all Ph.D. candidates in the Genetics Program. Limited to students enrolled in the Genetics Program unless special permission is obtained from the director. (Fall)

**398 Advanced Reading and Research (arr.)**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

Anat 203	Human Developmental Anatomy
Bioc 221-22	General Biochemistry
Bioc 223	Physical Biochemistry
Bioc 231	Bioenergetics
Bioc 234	Structure and Function of Proteins and Enzymes
Bioc 250	Molecular Biology
Bioc 251	Advanced Topics in Molecular Biology
Bioc 252	Biochemical and Molecular Aspects of Selected Diseases
Bioc 266	Cellular Biology
Bioc 270	Biochemistry and Cell Biology of the Immune Response
BiSc 102	Cell Biology
BiSc 103	Cell Biochemistry
BiSc 104	Cell Biochemistry Laboratory
BiSc 107	Genetics
BiSc 108	Genetics Laboratory
BiSc 109	Advanced Genetics
BiSc 114	Principles of Development
BiSc 115	Experimental Developmental Biology
BiSc 126	Radiation Biology
BiSc 137	Introductory Microbiology
BiSc 220	Seminar: Cell or Plant Biochemistry
BiSc 227	Seminar: Genetics
BiSc 228	Population Genetics
BiSc 229	Cytogenetics
BiSc 230	Human Genetics
BiSc 249	Seminar: Developmental Biology
BiSc 272	Electron Microscopy
BiSc 274	Gene Regulation and Genetic Engineering
BiSc 275	Introduction to Recombinant DNA Techniques
Micr 229	Immunology
Micr 233	Virology
Micr 234	Virology Laboratory
Micr 241	Survey of Molecular Biology Techniques
Micr 258	Microbial Genetics
Micr 260	Cellular Immunology
Phar 203	Fundamental Principles of Pharmacology
Phar 220	Molecular Events in Toxic Actions
Phar 222	Genetic Toxicology
Phar 242	Molecular Carcinogenesis
Stat 127	Statistics for the Biological Sciences
Stat 129	Introduction to Computing

**GEOBIOLOGY****Committee on Geobiology**

A.G. Coates (Chair), A. Brooks, M.A. Buzas, R.E. Knowlton, D.L. Lipcomb, H. Merchant, L. Osterman, A. Viterito

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of geobiology. The program is directed by a committee whose members are drawn from the Departments of



**Anthropology, Biological Sciences, Geography and Regional Science, and Geology.** It is enhanced by cooperative relationships with the Smithsonian Institution and the U.S. Geological Survey.

A bachelor's degree in anthropology, biology, botany, geography, geology, or zoology from this University, or an equivalent degree from another accredited institution of higher learning, is required for admission to the program. **Prerequisite University courses** (or equivalent courses elsewhere) include the following: BiSc 130 or 132 or Anth 186, BiSc 150 or Anth 187, BiSc 154, Geol 2, 151 or 154 or Anth 188, Stat 91.

**Master of Science in the field of geobiology**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The program includes 30 credit hours of course work, plus a thesis (equivalent to 6 credit hours). Required courses include BiSc 168 or 169, 208, 209; Geol 195, 254, and 255. Electives are selected from the following (to total, with the required courses, at least 30 credit hours): Anth 152, 183-84, 201, 204, 247, 283, 294; BiSc 109, 118, 132, 134, 135, 155, 156, 157, 167, 168, 169, 204, 210, 211, 221, 227, 228, 229, 238, 239, 242, 243; Geog 104, 106, 108, 219, 220; Geol 105, 125, 128, 152, 154, 158, 163, 175, 181, 241, 253, 258, 263, 266. Listings of courses at the 100 level are to be found in the Undergraduate Programs Bulletin.

**Doctor of Philosophy in the field of geobiology**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The program includes 48 credit hours of course work, plus a dissertation (equivalent to 24 credit hours). Required courses include: BiSc 208, 209, 211, 228; Geol 125, 195, 254, 255, 263. Electives are to be selected from remaining elective courses listed for the master's degree (to total, with the required courses, at least 48 credit hours).

**Research fields:** Any subdiscipline of anthropology, biology, geography, or geology that pertains to research in ecology and evolution.

#### 295 Research (arr.)

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit.

#### 299-300 Thesis Research (3-3)

#### 398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

#### 399 Dissertation Research (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit.

### GEOGRAPHY AND REGIONAL SCIENCE

Professors J.C. Lowe, D.E. Vermeer (Chair)

Professorial Lecturers E. Marasciulo, J. Banister, M.J. Sagers

Associate Professorial Lecturers J.A. Zinn, S.E.S. Mastran, W.B. Wood

Assistant Professors A. Viterito, M.W. Lewis, D.M. Hart, M.D. Price

**Master of Arts in the field of geography**—Prerequisite: a bachelor's degree with a major in geography or in a related field in the social or natural sciences.

Required: the general requirements stated under the Graduate School of Arts and Sciences. Course work must include Geog 105 (Techniques of Spatial Analysis) and 250.

Thesis and nonthesis options are available. The thesis option requires a minimum of 30 credit hours of course work, including Thesis Research; the nonthesis option requires completion of 36 credit hours of graduate work. All degree candidates must take a Master's Comprehensive Examination that covers the substance of academic work pursued under the program of study.

Students entering the program without a bachelor's degree with a major in geography will be required to take prerequisite courses as determined by the department. All entering students must have completed one course, or its equivalent, from each of the following

geography: physical-resource geography (Geog 108, 132, 135), population/cultural/political geography (Geog 127, 145, 146); urban/economic geography (Geog 125, 140, 141).

Depending upon the chosen field of specialization, each student will select electives from appropriate courses within the department or from related programs and departments within the University or the Consortium of Universities. The student's program of study will be developed in consultation with the advisor and graduate committee.

Master of Science and Doctor of Philosophy in the field of geobiology, see Geobiology

With permission, a limited number of 100-level courses in the department may be taken for graduate credit, additional course work is required. See the Undergraduate Program Bulletin for course listings.

- 219 **Seminar: Climatology** (3)  
Atmospheric circulation systems, controls, and distribution. Elements of synoptic climatology, including climate modeling. Viterbo
- 220 **Seminar: Climatic Change** (3)  
Climatic history, examination of natural and induced climatic change. Viterbo
- 222 **Seminar: Resources and the Environment** (3)  
Analysis of the spatial variations and interrelationships of resources and the environment. Staff
- 223 **Seminar: The Population-Food Balance** (3)  
Spatial problems associated with the dynamics and interaction of population growth and agricultural output. Staff
- 224 **Seminar: Political Geography** (3)  
Examination of the political factor in location theory and analysis of the natural political territories. Low
- 225 **Seminar: Transportation and Development** (3)  
Transportation and communication in the organization of space. Low
- 230 **Seminar: Resource Issues in Development** (3)  
A consideration of the differential regional implications of and responses to resource and environmental policy decisions due to regional differences in societal and physical parameters. Low
- 243 **Seminar: Urban Geography** (3)  
Evolving morphology and internal spatial patterns of cities. Staff
- 244 **Seminar: Urban Systems and Development** (3)  
Central place theory and other theories of urban location and the organization of systems of cities. Har
- 250 **Regional Development** (3)  
Geographic perspectives on the policy, planning, and programmatic aspects of regional development. Marasciulo
- 261 **Latin American Geopolitical Trends** (3)  
Political and economic factors in a development context; emphasis on natural and human resources and environmental and land use issues. Staff
- 265 **Seminar: Geography of the Soviet Union** (3)  
Survey of U.S.S.R. regions and major topical themes of Soviet geography, including population, energy, agriculture, transportation, and regional development. Barnes
- 266 **Seminar: Geographic Perspectives on Contemporary China** (3)  
China's development prospects: environmental constraints, population growth, and regional differences in the context of Chinese cultural patterns and political organization. Barnes
- 290 **Principles of Demography** (3)  
Same as Econ/Soc/Stat 290. Boulter
- 291 **Methods of Demographic Analysis** (3)  
Same as Econ/Soc/Stat 291. Staff
- 295 **Research** (arr.)  
May be repeated for credit. Staff
- 299-300 **Thesis Research** (3-3)

## GEOLOGY

Professors F.R. Siegel, A.G. Coates, R.C. Lindholm, J.F. Lewis, D.J. Stanley (Resource)  
G.C. Stephens (Chair)  
Adjunct Professor W. Back  
Associate Professorial Lecturer J.F. Sutter  
Assistant Professor R.P. Tollo  
Assistant Professorial Lecturers L.E. Edwards, M.J. Baedeker

Master of Science in the field of geology—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science with a major in geology.



Required: the general requirements stated under the Graduate School of Arts and Sciences. Course work must include Geol 205, 240, 261, and 272. Candidates are required to pass a Master's Examination

Both thesis and nonthesis options are available. Under the thesis option, a minimum of 30 credit hours of course work is required, including Thesis Research; candidates must pass the Master's Examination before completing their thesis work. Under the nonthesis option, a minimum of 36 credit hours of course work is required. course work must include Geol 128, 189, 219, 274, and 295. Two electives must be chosen from Geol 216 or 263, 211 or 224, 241 or 243, and 158 or 254 or 266.

Master of Science in the field of geochemistry (an interdepartmental degree offered by the Departments of Geology and Chemistry)—Prerequisite: a bachelor's degree with a major in geology or in chemistry and, at a minimum, introductory courses in the other field.

Required: the general requirements stated under the Graduate School of Arts and Sciences, including Chem 111–12, Geol 240, 241 or 243, 249, Chem 213 or other upper-level chemistry course approved by the advisor; and Geol 299–300. Geol 105, 111, 122, 124, 132, 136, 151, and 152 may not be taken for graduate credit. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. Stat 129 or another course approved by the advisor must be passed.

Master of Science and Doctor of Philosophy in the field of geobiology—see Geobiology.

Doctor of Philosophy in the field of geology—Required: the general requirements stated under the Graduate School of Arts and Sciences and the satisfactory completion of the General Examination in three fields, one of which must be in petrology, stratigraphy, or structural geology.

Research fields: geochemistry, hydrogeology, marine geology, mineralogy, paleontology, petrology, sedimentology, stratigraphy, and structural geology.

Doctor of Philosophy in the field of geochemistry (an interdepartmental degree offered by the Geology and Chemistry Departments)—Required: the general requirements stated under the Graduate School of Arts and Sciences, including the satisfactory completion of Stat 129 and either Stat 118 and 119 or Stat 91, and the satisfactory completion of the General Examination in four fields, including geochemistry and chemistry.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

#### 205 Seminar in Geology (1)

Staff

Special topics each semester. May be repeated for credit.

#### 211 Advanced Mineralogy (3)

Tollo

Crystal chemistry, phase relations, and paragenesis of major rock-forming minerals. Prerequisite: Geol 111 or permission of the instructor. (Spring, odd years)

#### 216 Sedimentary Petrography (3)

Lindholm

Identification, classification, and interpretation of common sedimentary rocks by means of the petrographic microscope. Prerequisite: Geol 112, 261; or permission of instructor. Laboratory fee, \$25. (Fall, odd years)

#### 219 Petrogenesis I (3)

Lewis

The origin of selected igneous and metamorphic rock types. Prerequisite: Geol 117, 118, or permission of instructor. Laboratory fee, \$22. (Fall)

#### 220 Petrogenesis II (3)

Lewis

Laboratory fee, \$22. (Spring)

#### 224 Advanced Structural Geology (3)

Stephens

Study of problems in structural analysis and tectonics. Prerequisite: Geol 122. (Spring, odd years)

#### 240 Principles of Geochemistry (3)

Siegel

Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12, Math 31, Phys 1 or 3, or permission of instructor. Laboratory fee, \$15. (Fall)

#### 241 Marine Geochemistry (3)

Siegel

Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and biochemical

- activity in oceans. Methods of analysis and problems of measuring. Prerequisite: Geol 240 or permission of instructor. Recommended: Chem 22. Laboratory fee, \$20. (Spring, even years)
- 243 Geochemical Prospecting (3)**  
Application of geochemical principles and analyses to the detection of hidden mineral and energy resources. Field trips as arranged. Prerequisite: Geol 240. Laboratory fee, \$20. (Spring, odd years)
- 249 Seminar: Geochemistry (2)**  
Independent topics each semester; may be repeated for credit.
- 254 Evolutionary Paleobiology (3)**  
Consideration of modern evolutionary theory with emphasis on the fossil record. (Fall, even years)
- 255 Quantitative Paleocology (3)**  
Characteristics of populations applicable to the fossil record. Subject matter includes ecosystem concept, habitat, Hutchinsonian niche, life-death size-frequency distributions, competitive exclusion principle, spatial distributions, relative abundance and diversity, quantification of community biofacies. Prerequisite: Geol 151-52, Stat 91, or permission of instructor. (Fall, odd years)
- 257 Micropaleontology (3)**  
Biology, morphology, paleocology, biogeography, and biostratigraphy of marine and nonmarine phosphatic, organic, siliceous, and calcareous microfossils. Prerequisite: Geol 1-2 or permission of instructor. (Fall, even years)
- 258 Seminar: Micropaleontology (3)**  
Prerequisite: Geol 257 or permission of instructor. May be repeated for credit. (Fall, odd years)
- 261 Sedimentology (3)**  
Lecture and laboratory, field trips as arranged. Principles of sedimentology, analysis and interpretation of sedimentary processes and environments. Prerequisite: Geol 1; Stat 91; or permission of instructor. Laboratory fee, \$22. (Spring)
- 263 Sedimentary Environments (3)**  
Study of selected depositional environments. Field trips as arranged. Prerequisite: Geol 261. Laboratory fee (field trips), \$20. (Fall, even years)
- 266 Advanced Stratigraphy (3)**  
Analysis of special topics in stratigraphy. Historical background, concepts, facies, cycles of sedimentation, clastic and carbonate subsurface lithofacies, subsurface biostratigraphy, ecological and evolutionary attributes of stratigraphically useful organisms, quantitative methods, isochronology, geochronology, and magnetic stratigraphy. Prerequisite: Geol 166. (Spring, even years)
- 272 Regional Geology of North America (3)**  
Stratigraphy, structure, and tectonic evolution of selected geologic provinces in North America. (Spring, even years)
- 274 Hydrogeology (3)**  
The occurrence, storage, movement, quality, and problems of pollution of surface water and the hydrologic properties of water-bearing materials. Prerequisite: Geol 111, 122, Math 31, Chem 11-12; or permission of instructor.
- 275 Geochemistry of Groundwater (3)**  
Application of geochemical principles to the interpretation and prediction of groundwater activity in regional systems, carbonate and silicate equilibria, weathering and redox reactions; isotopes; and contaminated aquifers. Prerequisite: Geol 240, 274 (may be taken concurrently), or permission of instructor. (Fall, odd years)
- 276 Advanced Groundwater: Modeling (3)**  
Review of basic theory of aquifer systems, analysis of aquifer testing, and numerical methods applied to groundwater problems. Prerequisite: Geol 274 or permission of instructor. A knowledge of FORTRAN is desirable. (Spring, odd years)
- 295 Research (arr.)**  
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit. (Fall and spring)
- 299-300 Thesis Research (3-3)**  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.



**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

Staff

**GERONTOLOGY****201 The Biology of Aging (3)**

Staff

The processes of aging in the various systems of the human body: principal illness patterns in the elderly, theories of the aging process (Fall)

**205 Public Policy and Aging (3)**

Morrison

The "political economy" of aging in our society. Political and governmental processes as they influence and are influenced by older persons, the impact of demographic trends and retirement patterns on the economic system (Fall)

**290 Practicum in Gerontology (3)**

Morrison

Field experience in an agency involved in the planning and evaluation of services for the elderly.

**HEALTH SERVICES MANAGEMENT AND POLICY**

Professors K.J. Darr, P.N. Reeves, P.S. Birnbaum, R.G. Shouldice, J. Ott, R.F. Southby (Choir), L.G. Pawlson, R. Riegelman, M.J. Shaffer, W. Greenberg, D.L. Infeld, P. Budetti, R.S. Hanft (Visiting Research)

Associate Professors D.L. Zalkind, G.E. Crum, S.R. Eastaugh

See the School of Business and Public Management for programs of study leading to the degrees of Master of Health Services Administration, Specialist in Health Services Administration, and Doctor of Philosophy.

**202 Introduction to Health and Medical Care (3)**

Crum

Examination of concepts of health and disease from physical and philosophical perspectives. Description and analyses of various components of the health care system, including medical technology and the health professions (Fall and spring)

**203 Organization and Management of Health Services (3)**

Staff

Application of management theory and concepts to health services systems and institutions. Characteristics, functions, and organizational structures of delivery systems. (Fall and spring)

**206 Quantitative Methods in Health Services Operations (3)**

Zalkind

Concepts and applications of statistical methods in health services operations. Probabilistic reasoning and statistical methodology. Sampling and study design. Critiques of statistical studies and reporting. Prerequisite: Stat 51 or equivalent or permission of instructor. The statistics course must be passed with a grade of B or better within two years prior to enrolling in HSMP 206. (Fall and spring)

**207 Health Services Information Applications (3)**

Zalkind, Infeld

Introductory survey of health information systems. Decision-making needs, collection, analysis, and reporting of data. Principles of managing the acquisition and development of health services information systems. Prerequisite: HSMP 206 and knowledge of microcomputer spreadsheet or database software (Fall and spring)

**210 Health Economics (3)**

Greenberg

Economics of the health care sector. An economic analysis of public policy alternatives in the health industry. Roles of the physician, hospital, insurance, and other health care markets are examined. Prerequisite: Econ 217 or equivalent. (Fall and spring)

**211 Health Finance (3)**

Eastaugh

Introductory survey of theoretical and practical approaches to the financial management of health care institutions. Specific attention is given to rate regulation, hospital reimbursement and accounting, financial ratio analysis and feasibility studies, and strategic marketing. Prerequisite: Accy 201. (Fall and spring)

**212 Introduction to Health Services Planning (3)**

Reeves

Survey of community and institutional health systems planning and evaluation. Introduction to policy planning, strategic planning, project planning, marketing, and evaluation as they apply to health services (Fall and spring)

- 215 Health Services and the Law (3)**  
The sources of law and the legal processes affecting the health services system. Elements of administrative law and agency processes. Introduction to the legal relationships (e.g., torts, contracts, and insurance) of facilities, physicians, personnel, and patients. Personnel administration; legal aspects of labor relations; trends in health services delivery law. (Fall and spring)
- 221 Health Systems Strategic Planning (3)**  
Application of strategic planning concepts to health services. Study of the strategic planning process as a series of interrelated analyses and decisions, including representative analytic methods used in the most critical stages. Discussion of the relationships among strategic planning, project planning, marketing, and financial planning. (Fall and spring)
- 223 Policy in Strategic Health Services Planning (3)**  
Effects of legal, political, social, governmental, and economic factors in strategic health planning. Emphasis on formulation, analysis, and implementation of state, local, and institutional health policies. The role of these policies as expressions of values that serve as guiding forces in the strategic planning process. (Summer)
- 225 Developing National Health Services Policy (3)**  
Understanding and analyzing the processes by which health services policy is formulated and implemented at the federal level. Focus on Congress, the presidency, and the agencies. Same as PubH 225. (Spring)
- 227 Seminar: Ethics in Health Services Administration (3)**  
Managerial implications of ethical issues in health services delivery: administrative and institutional ethics; professional codes; decisions concerning impaired professionals, dying patients, fertility control, experimentation, and new technology; resource allocation. (Spring)
- 231 Managing the Short-Term Hospital (3)**  
Organization and management of the acute care hospital—administration, finance, and medical staff. Relationships and procedures of clinical support and administrative departments. Administrative ethics. Requirements of the Commission on Accreditation of Healthcare Organizations. Prerequisite: HSM 203 and Mgt 210. (Fall and spring)
- 233 Delivery of Mental Health Services (3)**  
Study of the organizations and systems for delivery of mental health services with emphasis on managing and financing treatment and rehabilitation facilities. (Summer)
- 236 Introduction to Long-Term Care Administration (3)**  
An overview of the field of long-term care and its evolution within the health care and social service systems. The "continuum" of long-term care services, institutions and in the community, funding sources for those services, and policy issues involved in delivery of services. Site visits to long-term care programs. (Fall and spring)
- 237 Managing the Long-Term Care Institution (3)**  
Organization and management of nursing homes, personal and residential care facilities, and institutions for other populations needing long-term specialized treatment. Emphasis on personal and professional skills necessary to provide a wide range of services and quality care in these environments. (Summer)
- 238 Ambulatory Health Services Management (3)**  
Introduction to the organization and management of ambulatory care. Presentation of models, financing mechanisms, institutional affiliations, estimating and planning for ambulatory care, and the use of group practice of medicine as part of a total system of services delivery. (Spring and Summer)
- 239 Management of Alternative Delivery Systems (3)**  
Principles and fundamentals of prepaid group practice and health maintenance organizations and other alternative financing delivery mechanisms. Emphasis on planning, development, and operation of HMOs and CMPs, including presentation of models, financial issues, consumers, and providers of care. (Summer)
- 245 Case Studies in Health Services Administration (3)**  
Intensive qualitative and quantitative analyses of major problem areas in health system administration and planning, using the case study method. Cases by Southby, Birnbaum, etc.



the broad spectrum of health policy, planning, and management of the health services system. Serves as a capstone course for health services students (Fall and spring)

- 252 **Comparative Health Services Systems** (3) Southby  
Evaluations of various organizational patterns, functions, and trends in international health services delivery systems. Emphasis on sources of such differences and the significance of systems to the health status of a nation (Spring)
- 255 **Issues in Gerontology** (3) Infeld  
Interdisciplinary seminar on the nature and problems of aging, including demographic, biological, psychological, social, economic, environmental, and political perspectives on the status and needs of the older population. Theory and research; service delivery, attitudes and behaviors based on contact with older persons. (Fall)
- 257 **Advanced Health Resources Management** (3) Eastaugh  
Methods, techniques, and policies used in health resources management. Prospective rate regulation under DRGs, capital investment and buy-lease decisions, financial feasibility studies, cost accounting, and strategic financial planning. Financial management of health care delivery systems. Prerequisite: HSMP 211. (Fall and spring)
- 260 **Administration of Health Systems** (3) Crum  
Same as PubH 213. See the School of Medicine and Health Sciences Bulletin.
- 262 **Economics of Health Care** (3) Greenberg  
Same as PubH 211. See the School of Medicine and Health Sciences Bulletin.
- 263 **Health Services Financial Management** (3) Eastaugh  
Same as PubH 263. See the School of Medicine and Health Sciences Bulletin.
- 264 **Health Planning and Marketing** (2 or 3) Budetti  
Same as PubH 214. See the School of Medicine and Health Sciences Bulletin.
- 265 **Health Law** (3) Staff  
Same as PubH 265. See the School of Medicine and Health Sciences Bulletin.
- 267 **Health and Society** (2) Staff  
Same as PubH 205. See the School of Medicine and Health Sciences Bulletin.
- 268 **Case Studies in Administrative Medicine** (2 or 3) Crum  
Same as PubH 287. See the School of Medicine and Health Sciences Bulletin.
- 270 **Research in Health Services Administration** (3) Southby  
Field research. Primarily for advanced students, open to others with consent of instructor. May be repeated for credit. (Fall and spring)
- 271 **Field Problem Studies** (3) Good  
Work experience guided by a qualified preceptor on selected management and planning issues and problems occurring in health services facilities, programs, and agencies. Primarily for advanced master's and doctoral students, open to other students by arrangement. May be repeated for credit (Fall and spring)
- 273-78 **Residency** (3 each) Staff  
Work experience guided by a qualified preceptor, periodic written progress reports and a written major report or selected field projects as required.
- 285-86 **Readings in Health Services Administration** (3-3) Southby and Staff  
Supervised readings in special areas of health services management and in policy and planning. Primarily for advanced students, open to others by arrangement. May be repeated for credit. (Fall and spring)
- 290 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated for credit. (Fall or spring)
- 290-300 **Thesis Research** (3-3) Southby  
Study of major contemporary issues in health policy and health economics issues. (Spring)
- 310 **Seminar in Health Economics** (3) Greenberg  
Development and critique of policies designed to deal with current health issues. (Spring)
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3) Staff  
Same as SMPP 311.
- 330 **Health Services Delivery Policy** (3) Southby  
Study of major contemporary issues in health services delivery. Development and critique of policies designed to deal with those issues. For doctoral and Specialist students, to be taken toward the end of course work for the degree (Fall)

**398 Advanced Reading and Research (arr.)**

Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Limited to doctoral candidates. May be repeated for credit.

**HEBREW**

See Classics.

**HISTORY**

Professors H.M. Sachar, R.W. Kenny, P.P. Hill, L.G. DePauw, R. Thornton, L.G. Schworer, P.F. Klarén, R.E. Kennedy, Jr., W.H. Becker (Chair), L.P. Ribuffo, E. Berkowitz, R.H. Spector

Professorial Lecturers S. Shaloff, B.F. Cooling

Associate Professors C.J. Herber, W.R. Johnson, R.A. Hadley, A.D. Andrews, J.O. Horton, M.A. Atkin, S. Strasser

Adjunct Associate Professor K. Bowling

Associate Professorial Lecturer R.M. Hathaway

Assistant Professors H.L. Agnew, R.B. Stott, G. Savage (Visiting)

Director and Principal Investigator of the First Federal Congress Project C. Bickford

**Master of Arts in the field of history**—Prerequisite: a bachelor's degree from an accredited college or university with a major in history, or an equivalent degree; high scholastic standing; and approval of the department.

Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of either a minimum of 30 credit hours of 100- and 200-level courses, including Hist 299–300, Thesis Research, and at least three other 200-level courses, or a minimum of 36 credit hours of 100- and 200-level courses, including at least two research seminars (6 credit hours) and four readings research seminars. See the Undergraduate Programs Bulletin for a listing of 100-level courses offered by the department. Exceptions to the minimum for 200-level courses can be granted only by the department's Graduate Programs Committee. Hist 201 is required of candidates who have not previously had a course in historiography and historical method. A maximum of 6 credit hours may be in approved courses outside the History Department. To receive graduate credit for 100-level courses, master's candidates must arrange for extra work with the instructors. Each student works in two fields of history and is required to pass a Comprehensive Examination in each.

**Master of Arts in the field of history with a concentration in historic preservation**—Required: the general requirements stated under the Graduate School of Arts and Sciences. This 36-hour master's degree program combines courses in United States history and historic preservation. It includes at least 18 hours of U.S. social history, U.S. urban history, man-made America, and the seminar sequence in historic preservation. For other course distribution requirements, see the departmental graduate advisor. Candidates in this program may also be required to pass an examination in measured architectural drawing.

**Master of Arts in the field of history with a concentration in public policy**—Required: the general requirements stated under the Graduate School of Arts and Sciences. This 36-hour program emphasizes the study of history as it relates to the analysis and conduct of public policy. Hist 213–14 and an internship are required. Additional course work is to be chosen with advisor's approval.

**Doctor of Philosophy in the field of history**—Required: the general requirements stated under the Graduate School of Arts and Sciences, including the passing of a written examination in two appropriate foreign languages or in one foreign language and an approved subject (such as statistics or oral history), and the satisfactory completion of the General Examination in four fields. Normally, each doctoral candidate will work in one major (or general) field of study and three special fields. One of the special fields may be taken as a "write-off," as long as it is not in the area in which the candidate plans to write the dissertation. The major fields include the following: early modern Europe, modern Europe, United States, Latin America, modern Near East, modern East Asia, and modern Russia and the Soviet Union. Special fields may vary from the topical (e.g., U.S. social



history, European intellectual history, historic preservation, etc.) to the chronologically limited fields (e.g., American colonial history, classical and medieval Europe, Tudor and Stuart England, etc.). A student may elect one special field outside the History Department if it is relevant to the program. Students having a special field in historic preservation may be required to pass an examination in measured architectural drawing. In the final 24 hours of course work for the General Examination, except in preparation for the "write-off" examination, the candidate may enroll only in third-group courses. Any exception requires the approval of the Graduate Programs Committee.

**Doctor of Philosophy in the field of American religious history** (offered in cooperation with the Department of Religion)—Required: the general requirements stated under the Graduate School of Arts and Sciences and the specific requirements of the Doctor of Philosophy in the field of history, stated above. The General Examination must cover four fields, including two from the Department of History (generally American social history and one other) and two from the Department of Religion (history of religion in America and one other field in religious history).

**201 History and Historians (3)**

Historiography and historical method for graduate students. Readings and discussions on major trends in history; selections from classics of historical literature. Students who receive credit for Hist 201 cannot receive credit for Hist 199. (Spring) Staff

**203-4 Seminar: Research or Readings (3-3)**

Offered on demand for individual research programs. Prerequisite: approval of department. (Academic year) Staff

**205 Readings Seminar: Eastern European History, 1772-1918 (3)**

Agnew

**206 Readings Seminar: Eastern European History, 1919-1945 (3)**

Agnew

**209 Readings/Research Seminar: Topics in Ancient History (3)**

Hadley

Readings on general topics in the history of the ancient Near East, Greece, or Rome. Topics to be announced in the Schedule of Classes. Students with working knowledge of the appropriate language(s) may receive research credit

**213-14 History in Public Policy (3-3)**

Berkowitz

Seminar in the use of historical insights and methods in policy-making, with emphasis on domestic issues. Assessment and use of primary sources for policy analysis and the use of historical analogy in policy formulation

**217 Readings Research Seminar: Russian and Soviet Thought (3)**

Atkin

Selected topics in the intellectual, social, and cultural history of 19th- and 20th-century Russia and Soviet Union

**218 Readings Research Seminar: Soviet Nationalities (3)**

Atkin

An examination of the relationship between the U.S.S.R.'s multinational composition and its domestic political, economic, social, and cultural policies and foreign relations. Admission by permission of instructor (Spring)

**219 Internship in History and Public Policy (3 or 6)**

Berkowitz

Supervised participation in an office or agency concerned with the formulation of public policy; terms of the internship are arranged with the Director of the History and Public Policy Program. Enrollment restricted to students in the History and Public Policy Program. (Fall and spring)

**220 American Business History (3)**

Becker

The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the period since industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as BAd 293. (Spring)

**224 Readings/Research Seminar: European Intellectual History (3)**

Kennedy

Cultural history of the French Revolution. Interrelated changes in political and economic thought, theater, arts, religion, and science from 1789 to 1799. Continuity or discontinuity with pre- and post-revolutionary cultural life

**225 History of Washington, D.C. (3)**

Gillette

Same as AmCv 225.

**228 Readings/Research Seminar: Modern Military and Naval History (3)**

Staff

Discussion, readings, and research in 20th-century European and American military and naval history.

- 229 **Seminar: World War II (3)**  
Examination of statecraft and the management of force before, during, and after World War II. Special attention to broad aspects of military policy and strategy and their interaction with international politics and diplomacy. *Staff*
- 230-31 **Readings/Research Seminar: Strategy and Policy (3-3)** *Schinger*  
Hist 230: A study of the historical development of strategy and the relationship of military thought to national policy. Hist 231: 20th-century strategic thought (Academic year) *Wolchik*
- 232 **Comparative Communist Systems I (3)** *Wolchik*  
Same as PSc 232.
- 233 **Comparative Communist Systems II (3)** *Wolchik*  
Same as PSc 233.
- 237 **Readings Seminar: Soviet Foreign Policy, 1917-1964 (3)** *Staff*  
Concepts and perceptions guiding Soviet relations with the outside world. From the blockade and intervention, through years of isolation, World War II, the Cold War, to "peaceful coexistence" and detente. *Schworer*
- 239 **Readings/Research Seminar: Early Modern European History (3)**  
Topics selected from Western European history of the 14th through 17th centuries. Readings or research, depending upon students' interests and curricular needs. *Harber*
- 241 **Readings/Research Seminar: Modern European History (3)** *Atkes*  
Prerequisite: appropriate preparation and consent of instructor
- 246 **Readings/Research Seminar: History of Modern Russia and Soviet Union (3)** *Devson*  
Selected topics in the domestic history of modern Russia and Soviet Union (Fall)
- 248 **Readings Seminar: Modern Near Eastern History (3)** *Staff*  
Admission by permission of instructor (Spring)
- 249 **Research Seminar: European Diplomatic History (3)**  
Research seminar in individually selected topics concerning the foreign policies, actions, and interrelations of the European great powers and their statesmen of the 19th or 20th century. Reading knowledge of one language other than English required. (Fall) *Kenny, Schworer*
- 251 **Readings/Research Seminar: English People and Institutions (3)**  
Selected topics in the political, social, intellectual, and economic history of England. Focus upon one time period and special area of interest. (Fall and spring) *Thornon*
- 253-54 **Readings Seminar: History of Sino-Soviet Relations (3-3)** *Thornon*  
Seminar designed to develop analytic and historiographic skills. Fall: turn of the century to 1949, spring, Korean War to the present. (Alternate academic years) *Thornon*
- 255-56 **Readings Seminar: U.S.-Soviet Strategic Relations Since World War II (3-3)** *Sodars*  
Seminar designed to develop a conceptual framework for understanding contemporary U.S.-Soviet relations. Fall: World War II to 1965, spring, 1965 to the present. (Academic year)
- 258 **Communist Party of the Soviet Union (3)** *Thornon*  
Same as PSc 258.
- 259-60 **Research Seminar: Problems in U.S.-Soviet-Chinese Relations (3-3)**  
Development of scholarly skills through preparation of a research paper. Prerequisite: Hist 254 or 255 or permission of instructor. (Alternate academic years) *Alar*
- 261-62 **Readings/Research Seminar: Topics in Modern Latin America (3-3)** *Ribuffo*  
Admission by permission of the instructor
- 267 **Readings/Research Seminar: American Social Thought Since World War II (3)**  
Consideration of C. Wright Mills, Daniel Bell, Abraham Maslow, Christopher Lasch, Paul Goodman, Martin Luther King, Jr., Barbara Ehrenreich, and other major social critics. (Fall) *Christopher*



- 271-72 U.S. Social History (3-3)** Horton  
Hist 271 Readings seminar on American daily life, institutions, and intellectual and artistic achievements. Hist 272 Research seminar. Hist 271 is prerequisite to Hist 272.
- 275-76 Readings Research Seminar: U.S. Political and Colonial History (3-3)** Staff  
Research or readings, depending on students' interest and curricular needs. Topics on various aspects of the colonial period or political aspects of various periods. Admission by permission of instructor. (Academic year)
- 277-78 Historic Preservation: Principles and Methods (3-3)** Longstreth  
Same as AmCv/UPRE 277-78.
- 279 Readings Research Seminar: American History (3)** Hill  
Readings or research, depending on students' interests and curricular needs. Admission by permission of instructor. (Summer)
- 281-82 Readings/Research Seminar: U.S. Diplomatic History (3-3)** Hill  
Research or readings, depending on students' interest and curricular needs. Hist 281: 1776-1890; Hist 282: 1890-1950. (Academic year)
- 283-84 Readings/Research Seminar: Recent U.S. History (3-3)** Ribuffo  
Prerequisite: 6 credit hours of 100-level American history courses. Research or readings, depending on students' interests and curricular needs.
- 285 Readings Seminar: Military and Women's History (3)** DePauw  
Admission by permission of instructor. (Fall, alternate years)
- 286 Research Seminar: Military and Women's History (3)** DePauw  
Admission by permission of instructor. (Spring, alternate years)
- 289 Readings Research Seminar: Modern Japanese History (3)** Staff  
Selected topics in modern Japanese history from the Meiji Restoration of 1868 to the present. Research or readings depending on students' interests and curricular needs. (Spring)
- 291 Readings Research Seminar: 20th-Century History (3)** Sachar  
Research or readings on selected topics. (Fall)
- 292 Israel, Zionism, and the Arab World (3)** Sachar  
Research seminar. (Spring)
- 293 Research Seminar: Modern East Asian History (3)** Johnson  
Readings, discussion, and research in selected political, economic, social, cultural, and international developments in the 19th and 20th centuries concerning countries from the Balkans, through Turkey and the Arab countries, to Iran. (Spring)
- 295-96 Readings Seminar: Modern East Asian History (3-3)** Johnson  
Open to doctoral and master's candidates and qualified undergraduates. May be repeated for credit. Offered whenever five or more students can be enrolled.
- 297 Special Topics Seminar (3)** Staff
- 298 Dumbarton Oaks Courses (arr.)**  
Courses offered each year by scholars in residence at Dumbarton Oaks are open to qualified graduate and undergraduate students with permission of department chairman. Topics will be announced. May be repeated for credit provided the topic differs.
- 299-300 Thesis Research (3-3)** Staff
- 301-14 Folger Institute Seminars (3 each)** Staff  
Topics will be announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Consult the chair of the department before registration.
- 342 Readings in Modern European History (3)** Staff  
From the French Revolution to the period following World War I. (Spring)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

### HUMAN KINETICS AND LEISURE STUDIES

Professors J.L. Breen, D.E. Hawkins, J.E. Snodgrass, D.C. Paup (Chair)  
 Adjunct Professors C.A. Troester, Jr., R. Anzola-Bentancourt, D.L. Edgell, S. Wahab  
 Adjunct Associate Professor D. Frechtling  
 Instructor E.C. Rach  
 Adjunct Instructors G.V. Swengros, S.D. Cook, S.A. Schulman

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development (with specialization in exercise science, tourism administration, and individualized programs in human kinetics and leisure studies).

### HUMAN KINETICS

- 201 **Experimental Course** (3)  
 Topic to be announced in *Schedule of Classes*. Staff
- 202 **Motor Learning and Performance** (3)  
 Variables of perceptual motor learning and performance; theories, concepts, and models of learning applied to teaching and coaching. (Fall) Staff
- 230 **Motor Development and Life-Span Fitness** (3)  
 Analysis of motor development and fitness throughout the life span, including practice in techniques of critical observation. (Spring) Snodgrass
- 255 **Fitness Evaluation and Exercise Prescription** (3)  
 Methods and techniques for providing individualized exercise and fitness prescriptions based on measurement and evaluation of physical fitness and health-related variables. Prerequisite: HmKn 152 or permission of instructor Paup
- 256 **Sports Medicine** (3)  
 Theory, practice, and research in diagnostic treatment, rehabilitation, and prevention of sports-related injuries. Prerequisite: HmKn 150 Breen
- 257 **Principles and Concepts of Employee Health/Fitness Programs** (3)  
 General overview of the employee health fitness movement in the U.S. and other countries. Public and private health policy implications will be analyzed together with national economic and political trends relating to the subject. Evaluation of model programs, procedures, and current practice. Swengros
- 259 **Exercise, Stress, and Cardiac Rehabilitation** (3)  
 Applied physiology of exercise and psychological stress in relation to coronary artery disease and myocardial infarction; the principles and practice of rehabilitation of patients recovering from a coronary event (heart attack or heart surgery) by exercise therapy and risk-factor reduction. Prerequisite: HmKn 152 or permission of instructor. (Fall) German
- 280 **Advanced Workshop** (1 to 3)  
 Topic to be announced in *Schedule of Classes*. Contemporary issues and problems; development of advanced professional competencies. May be repeated for credit with permission of advisor. (Fall and spring) Staff
- 282 **International Experiences** (1 to 6)  
 For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. Breen and Staff
- 283 **Practicum** (3 to 6)  
 For master's degree candidates enrolled in the department. Fieldwork, internship, and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer) Staff
- 290 **Advanced Seminar** (1 to 3)  
 Topic to be announced in *Schedule of Classes*. May be repeated for credit with approval of advisor. (Fall and spring) Breen and Staff
- 293 **Independent Study** (1 to 6)  
 For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. Breen and Staff



- 297 **Advanced Topical Studies** (3) Breen and Staff  
For master's degree candidates enrolled in the department. Independent research and study pertinent to the needs of the student. Prerequisite: Educ 295 or permission of instructor. (Fall and spring)
- 299 **Thesis Research** (6) Staff

## TRAVEL AND TOURISM

- 201 **Experimental Course** (3) Staff  
Topics announced in the Schedule of Classes. (Fall, spring, and summer)
- 230 **Organization and Management of Airlines** (3) Staff  
(Overview of domestic and international passenger air transportation systems. Analysis of planning, financing, operating, marketing, and evaluating airline transportation systems. Legal and regulatory aspects of airline operation. Attention is devoted to development of infrastructure and related support services. (Summer)
- 249 **Economic, Sociocultural, and Environmental Aspects of Tourism** (3) Hawkins  
Impact of tourism on economic development and cultural values; specific emphasis on psychosocial, physical, and community impacts. (Fall and summer)
- 250 **Administration of Travel and Tourism Services** (3) Staff  
Organization and management concepts, theories, and issues, stressing application of theory through analysis of short case examples drawn from the broader range of the travel and tourism industry. (Fall and summer)
- 260 **Tourism Development** (3) Rach  
Relationship of economic theory and principles to tourism development, applications of financial analysis techniques to the travel and tourism field. (Fall)
- 261 **Planning for Tourism** (3) Anzola-Betancourt, Wahab  
Integrated planning for travel and tourism organizations; financial and physical development for comprehensive tourism projects; consideration of basic concepts, approaches, and models. (Spring and summer)
- 282 **Tourism Policy Analysis** (3) Edgell  
Understanding components of tourism policy, development of tools for tourism policy analysis, and description of tourism organizations in the government and private sector. (Spring and summer)
- 283 **Tourism Marketing** (3) Rach, Frechtling  
Concepts and techniques employed in marketing travel industry products and services, including its public- and private-sector components. Assessment of the tourism product, development of the marketing strategy, preparation of the marketing plan, and analysis of specific promotional programs. (Fall)
- 270 **Travel and Tourism Research** (3) Spivack, Cook  
Analysis of general research methods and tools and their application to the study of travel and tourism. (Spring and summer)
- 280 **Advanced Workshop** (1 to 6) Staff  
Workshops with emphasis on contemporary issues and problems, development of advanced professional competencies. May be repeated for credit with permission of advisor. (Fall, spring, and summer)
- 282 **International Experiences** (1 to 12) Staff  
For master's degree candidates enrolled in the department. Travel to a foreign country for study of a specific topic. May be repeated for credit with approval of advisor. (Fall, spring, and summer)
- 283 **Practicum** (3 to 6) Hawkins and Staff  
For master's degree candidates enrolled in the department. Fieldwork, internship, and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)
- 280 **Advanced Seminar** (1 to 3) Staff  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. (Fall, spring, and summer)
- 293 **Independent Study** (1 to 6) Staff  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. (Fall, spring, and summer)

**296 Systems Analysis of Tourism Services (3)**

Quantitative analysis, resource identification, design techniques, and other systems approaches applied to travel and tourism services. (Fall and summer)

**297 Advanced Topical Studies (3)**

For master's degree candidates enrolled in the department. Independent research and study pertinent to the needs of the student. Prerequisite: Educ 295 and T&T 270 or permission of instructor. (Fall, spring, and summer)

**299 Thesis Research (1 to 6)**

Individual research under guidance of a staff member. May be repeated for credit with approval of advisor. Prerequisite: Educ 295 and T&T 270 or permission of instructor.

**HUMAN RESOURCE DEVELOPMENT**

See Human Services.

**HUMAN SERVICES**

Professors C.E. Vontress, L. Winkler, D. Linkowski, E.W. Kelly, Jr., J.C. Heddesheimer, D.W. Dew (Research), C.H. Hoare (Chair)  
Associate Professors N.E. Chalofsky, N.M. Dixon, D.R. Schwandt  
Adjunct Associate Professors E.J. Berne, G.P. Kearsley, D.W. Miller, N. Nadler, E.A. Reeves  
Assistant Professor J. Garcia

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Education Specialist and Doctor of Education.

**COUNSELING****251 Foundations of Counseling (3)**

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall and spring)

**252 Small-Group Self-Awareness Workshop (0)**

For graduate students in counseling only. Laboratory fee, \$110.

**253 Counseling Interview Skills (3)**

Acquisition of counseling skills common to all theories through lectures, demonstrations by faculty, role playing, and videotaping. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall, spring, and summer)

**254 Personal and Social Adjustment (3)**

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Spring)

**255 Career Counseling (3)**

A consideration of theory, practice, and the body of information related to career counseling, choice, and development over the life span. Prerequisite: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall)

**257 Individual Appraisal in Counseling (3)**

Detailed study of individual analysis and appraisal techniques. Development of a systematic case study. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors), Psyc 131 or Educ 121 or permission of instructor is required for others. (Fall)

**259 Theories and Techniques of Counseling (3)**

An introduction to basic counseling and psychotherapeutic theories and associated techniques. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors), permission of instructor is required for others. (Fall and spring)

**261 Group Counseling (3)**

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring and summer)



**263 Cross-Cultural Counseling (3)**

Vontress

A consideration of procedures for, and impediments to, counseling culturally different clients. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring and summer)

**264 Counseling and Religion (3)**

Kelly

The theoretical and practical intersection of counseling, psychotherapy, and mental health considerations with religion and spirituality. The clinically effective and ethically responsible integration of religion and spirituality into counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring)

**265 Existential Counseling (3)**

Vontress

Consideration of how existential concepts such as courage, authenticity, freedom, meaning, existential anxiety, and responsibility may be used to develop a philosophical approach to counseling, including discussion of the existential counseling relationship, diagnostic procedures, and intervention strategies

**267 Foundations of Employee Assistance Programs (3)**

Staff

History, legislation, and foundations of practice of counseling in employee assistance programs. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others

**269 Counseling Substance Abusers (3)**

Staff

Individual, group, family, and self-help counseling applied to substance abusers. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others.

**271 Family Counseling (3)**

Winkler

The family as a system: how it affects the client and how the client affects it. Didactic presentations, role playing, and work with simulated families. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring)

**272 Human Sexuality for Counselors (3)**

Winkler

The purpose of this course is to increase the awareness and understanding of sexuality as it relates to counseling in contemporary society. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall)

**274 Counseling Older Persons (3)**

Linkowski

Special considerations and counseling emphases in regard to the life transitions and role changes that occur for older persons. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Summer)

**276 Foundations of Rehabilitation Counseling (3)**

Linkowski

Survey of history, philosophy, legislation, roles, and services. Visits to selected field sites. (Fall)

**278 Psychosocial Aspects of Disabilities (3)**

Linkowski

Impact of disabilities and concept of normalization. (Fall)

**280 Job Placement and Support (3)**

Staff

Job development and modification; placement of disabled persons. (Spring)

**281 Medical Aspects of Disabilities (3)**

Fabian, Linkowski

Chronic and traumatic disorders with rehabilitation implications. (Spring)

**284 Practicum in Counseling (1)**

Staff

Part of a two-semester clinical experience for degree candidates in counseling. Prerequisite: Cnsl 253, 255, 257, and 259; prerequisite or concurrent registration: Cnsl 261; concurrent registration: Cnsl 285. (Fall, spring, and summer)

**285 Internship in Counseling I (2)**

Staff

Part of a two-semester clinical experience for degree candidates in counseling. Concurrent registration: Cnsl 284. (Fall, spring, and summer)

**286 Internship in Counseling II (3)**

Staff

Part of a two-semester clinical experience for degree candidates in counseling. Prerequisite: Cnsl 285. (Fall, spring, and summer)

**293-94 Research and Independent Study (1 to 3)**

Staff

Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

**298-99 Thesis Research (3-3)****352 Organization and Administration of Counseling Services (3)**

Principles and procedures for designing and implementing counseling services.  
Admission by permission of instructor. (Spring) Staff  
Vontress

**358 Advanced Theories of Counseling (3)**

Critical analysis and evaluation of leading counseling theories and consideration of their implications for practice. For Ed.S. and Ed.D. degree candidates in the field of counseling. Admission by permission of instructor. (Fall) Vontress  
Staff

**359-60 Doctoral Internship in Counseling (3-3)**

Heddesheimer, Kelly Staff

**361 Seminar: Counseling (arr.)****391 Dissertation Research (arr.)**

Prerequisite: Educ 390.

**HUMAN RESOURCE DEVELOPMENT****236 Technical Programs in Human Resource Development (3)**

Analysis of the nature and scope of human resource development technical training in industry, government organizations, and labor unions. (Fall) Staff

**237 Designing Technical Training Programs (3)**

Applications of performance-based, criterion-referenced design models for technical skills training programs. Staff

**239 International and Multicultural Human****Resource Development (3)**

HRD and adult learning issues associated with international and intercultural change, cultural issues of diversity within U.S. organizations. (Spring) Schwandt

**263 Human Resource Development (3)**

Foundations and evolution of HRD; ethics and philosophy, societal organizational issues. Admission by permission of instructor. (Fall and spring) Chalofsky, Dixon, Schwandt  
Chalofsky

**264 Design of Adult Learning in****Human Resource Development (3)**

Training, education, and development programs for various client systems are planned using conceptual models. (Spring) Staff

**272 Internship in Adult Learning and Human****Resource Development (3 to 6)**

Supervised experience in selected areas of: human resource development and adult education. Admission by permission of instructor. (Fall and spring) Staff

**279 Adult Education (3)**

Current concepts and objectives, historical development, agencies involved, personnel, clients, programs on all levels—community through international. Hart

**280 Program Planning in Adult Education (3)**

Determining educational needs for adults in school and nonschool agencies; designing programs and instruction, budgeting and scheduling of adult programs. Field work with sponsoring agency. Prerequisite: HRD 279 and permission of instructor. Hart

**281 Adult Learning (3)**

Learning theories as applied to adults in individual and group learning transactions, effect of age on learning; psychological, physical, and social environment in adult education situations. (Spring and summer) Staff

**282 Instructional Strategies in Adult Learning Programs (3)**

Methods, techniques, and approaches, developing action-oriented learning situations for organizations. (Spring) Staff

**283 Interviewing Counseling for Human Resource Developers (3)**

Applications of interviewing, coaching, and counseling skills for the human resource development specialist and others in various occupational settings. Staff

**284 Evaluation of Human Resource Development Programs (3)**

Evaluation design strategies for adult learning programs in business, industry, government, voluntary and community organizations, and agencies. Hart

**286 Issues in Human Resource****Development Programs (3)**

Current issues and trends in the fields of adult education and human resource development. Admission by permission of instructor. (Fall and spring) Chalofsky, Dixon, Schwandt



**287 Management of Human Resource Development Programs (3)**

Chalofsky, Schwandt

Management of organizational units involved in promoting HRD activities. (Fall)

**289 Consulting Skills in Human Resource Development (3)** Dixon, Schwandt

Examination of the consulting process, consultant-client behaviors, and dilemmas, using theory and field experience for individual and organizational development. Prerequisite: HRD 261, 279, or approval of instructor. (Fall and spring)

**293-94 Research and Independent Study (1 to 3)** Staff

Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

**299-300 Thesis Research (3-3)** Staff

Chalofsky, Dixon, Schwandt

**321 Seminar: Advanced Issues in Human Resource Development (arr.)**

Chalofsky, Dixon, Schwandt

**327 Seminar: Applied Research in Human Resource Development (arr.)****379 Practicum in Adult Learning Programs (3 to 6)** Dixon

Supervised practical experience in various forms of adult education and human resource development. Admission by permission of instructor. (Fall and spring)

**391 Dissertation Research (arr.)** Staff

Prerequisite: Educ 390.

**INDIVIDUAL GRADUATE PROGRAMS****Committee on Individual Programs**

C.E. Rice (Program Director), A.D. Andrews, B.L. Catron, J.J. Cordes, W.B. Griffith, T.L. Hufford, P.H.M. Lengermann

Students with special academic goals may pursue individualized programs of study toward the Master of Arts or Master of Science, subject to approval by the Committee on Individual Programs and the dean. Courses must be drawn from a minimum of three fields, with a maximum of 18 hours from any one field. A majority of courses must be taken within the Graduate School of Arts and Sciences. The comprehensive examination is a final essay in which the integration of the program of study is demonstrated.

The Graduate School of Arts and Sciences offers the course listed below primarily for students with individualized interdisciplinary programs of study for the master's degrees. The Committee on Individual Programs, which has supervisory responsibility for Individual Programs students, provides the faculty for the Colloquium.

**250 Colloquium on Interdisciplinary Methodologies (3)** Staff

Analysis from several perspectives of the problems inherent in interdisciplinary study and research, conditions that justify interdisciplinary work, norms and strategies for success, and case studies. (Offered as the demand warrants)

**INTERNATIONAL AFFAIRS**

Professors Y. Alexander (Research), W.H. Becker, E. Berkowitz, B.L. Boulter, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, J.A. Frey, R.S. Goldfarb, O. Havrylyshyn, P.P. Hill, H.C. Hinton, M.A. Holman, Y. Kim, P.F. Klarén, J.E. Kwoka, Jr., W.H. Lewis, C.A. Linden, J.M. Logsdon, J.C. Lowe, C. McClintock, J. Millar, J.A. Morgan, Jr., C.A. Moser, H.R. Nau, B. Nimer, J. Pelzman, J.M. Post, P. Reddaway, B. Reich, L.P. Ribuffo, H.M. Sachar, B.M. Sapin, C.W. Shih, G. Sigur, H. Solomon, R.H. Spector, G. Stambuk, C.T. Stewart, Jr., R. Thornton, A.M. Yezer

Adjunct Professors R. Butterworth, T.F. Carroll, K.S. Flamm, J. Hardt, R.D.F. Palmer, E.L. Warner

Professional Lecturers J. Banister, E.G. Griffin, R.W. Lee, J. Urban

Associate Professors C.J. Allen, M.A. Atkin, M.D. Bradley, C.J. Deering, C.F. Elliott, H.B. Feigenbaum, J. Henig, C.J. Herber, W.R. Johnson, C.C. Joyner, Y.K. Kim-Renaud, M.C. LaFollette (Research), J.H. Lebovic, D.L. Lee, G. Ludlow, Y. Olkhovsky, R.W. Rycroft, S.C. Smith, M. Sodaro, H.S. Watson, S. Wolchik, R.Y. Yin

Adjunct Associate Professor M.B. Wallerstein

**Associate Professorial Lecturers** S.E. Johnson, G.R. Kieval

**Assistant Professors** H.L. Agnew, N.J. Brown, M.D. Moore, J.P. Rogers, N.S. Vonortas, G.C.Y. Wang

**Assistant Professorial Lecturers** G. Sandles, M.J. Sagers

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Master of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as opportunities to specialize in one of the traditional disciplines or in a regional area.

**Master of Arts in the field of international affairs**—This multidisciplinary program offers a wide range of choice and flexibility among fields and courses within a framework that emphasizes intellectual development in more than one academic discipline and practical policy-oriented study in special-functional or regional-area fields. Students may take graduate courses in anthropology, business administration, economics, geography and regional science, history, political science, psychology, sociology, and other disciplines.

**Prerequisite:** the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School of International Affairs. All degree candidates must take 36 credit hours of course work and prepare for comprehensive examinations in three fields. Candidates select at least one general field from those listed below and may take no more than 12 hours in one department. Students may write a thesis if they qualify by having a minimum 3.5 grade-point average, submitting a previously written research paper of high quality, and submitting a formal thesis proposal approved by their prospective thesis adviser. Thesis candidates may take no more than 15 hours of course work in any one department.

Beyond these limits, students are free to select any of the fields listed below, so long as they comprise a coherent program. Courses should be chosen with a view to their relevance to the selected fields. Candidates will be examined on their selected fields in the Master's Comprehensive Examination.

**General fields**—At least one general field must be chosen from international politics (PSc 240 and 241), comparative politics (PSc 230 and 231), modern political theory (PSc 205 and either 206 or 207), and international economics (Econ 283-84, to which Econ 217-18 or equivalent is prerequisite).

**Special fields**—Fields regularly offered include international law, international organization, international economic development, international business, international health and development, comparative aspects of communism, U.S. diplomatic history, U.S. foreign policy, U.S. foreign economic policy, history of strategy and policy, national security policy, and science, technology, and public policy.

**Regional fields**—Western Europe, Eastern Europe, Soviet Union, Middle East, Africa, South and Southeast Asia, China, Japan, and Latin America (for each geographic region courses are generally available in modern history, government and politics, and economic problems).

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

- 223 **Science, Technology, and International Affairs (3)**  
Exploration of implications of technological change for international economics and politics. Vonortas
- 253 **Defense Policy and Program Analysis I (3)**  
Analysis of U.S. defense budget, force posture, and program priorities. Methodology for defense planning and program evaluation. Special attention to strategic nuclear forces. Johnson
- 254 **Defense Policy and Program Analysis II (3)**  
Analytical methodology for defense policy and program choices. Special attention to U.S. general purpose forces, including forces for NATO Europe. Johnson
- 255-56 **Applied Quantitative Techniques (3-3)**  
The application of quantitative techniques in the solution of issues in defense policy. Butterworth
- 287 **Problems in Latin American Civilization (3)**  
Interdisciplinary seminar; each student writes a report on some aspect of a selected key theme. May be repeated for credit. Admission by permission of instructor. Klarén and Associated Faculty



- 290 **Special Topics in International Affairs (3)** Staff  
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*
- 291 **Colloquium: East Asia (3)** Hinton  
Colloquium for advanced students of East Asian affairs. Admission by permission of the instructor
- 292 **Colloquium: The Soviet Union and Eastern Europe (3)** Staff  
Colloquium for advanced students of Russian and Eastern European affairs. Admission by permission of the instructor
- 293 **Colloquium: National Defense Policies and Issues (3)** Staff  
Colloquium for advanced students of security policy studies. Admission by permission of the instructor
- 298 **Independent Study and Research (1 to 3)** Staff  
Limited to M.A. degree candidates. Written permission of instructor required.
- 299-300 **Thesis Research (3-3)** Staff

## INTERNATIONAL BUSINESS

Professors P.D. Grub, G.P. Lauter, R. Eldridge (Chair), G. Ghadar, Y.S. Park, H.G. Askari  
Associate Professor F. Robles  
Assistant Professor K. Visudtibhan

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy. Please note that the following courses were formerly offered by the Business Administration Department.

- 281 **Multinational Corporations in the World Economy (3)** Ghadar, Grub, Visudtibhan  
Business in the world economy, multinational corporations as economic, political, and social institutions, ownership and growth strategies, relationships to other nations, national and international controls, future of the multinational corporation. (Fall and spring)
- 282 **Seminar: International Trade (3)** Eldridge  
Classical and modern concepts of international trade theory, instruments and institutions of trade policy, barriers to trade, preferential treatment and trading blocs, trends and issues. (Fall and spring)
- 283 **Legal Aspects of International and Multinational Business (3)** Peterson  
Legal environment of international and multinational business including legal systems, antitrust laws, regulation of direct investment, international arbitration and expropriation, topics of current interest. (Fall and spring)
- 286 **International Marketing (3)** Lauter, Robles  
Organizational structures, analysis of international markets, market-entry strategies and product policies. Special issues: Channels of distribution, promotional and price policies. Prerequisite: MLOM 240. (Fall and spring)
- 267 **Regional International Marketing Systems (3)** Lauter  
Discussion of the political, economic, legal, and social characteristics of Europe, Japan, Latin America, Asia, the Middle East, Eastern Europe, and China, as they affect the marketing of goods and services in these regions. Identification of appropriate market-entry strategies. (Fall and spring)
- 271 **International Business Finance (3)** Ghadar, Park, Askari  
Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: Fina 120 or 220. (Fall and spring)
- 273 **Seminar: International Banking (3)** Park, Ghadar  
International financial intermediation and international banking. Functioning of international financial markets, public policy issues in international banking, regulation of multicountry banking institutions, and the effect of international banks on national monetary policies. Prerequisite: IBus 271. (Fall and spring)
- 275 **External Development Financing (3)** Ghadar, Park  
Required capital formation and the financing of payment imbalances through external sources. Institutions and instruments for financing national development. Planning as affected by energy policies, inflation, recession, and changes in the international monetary system. Prerequisite: IBus 271. (Fall and spring)

- 276 Seminar: International Financial Markets (3)** Park, Askari, Ghadar  
Theory and practice of international financial markets. Operation and structure of the Eurocurrency market, such as interbank operations, Eurodollar CDs, and floating-rate Eurocredits. Control of the Eurocurrency market and the role of other financial centers. Study of Eurobond and floating-rate note markets as well as major foreign bond markets. Prerequisite: IBus 271 or 273. (Fall and spring)
- 277 International Portfolio Selection and Management (3)** Siddhewala  
Theoretical knowledge and practical skills necessary for the efficient management of international financial asset portfolios. Numeraire currency, exchange rates, international taxation, international portfolio optimization, international financial assets and markets, performance measures and applications. Prerequisite: Completion of Common Body of Knowledge courses. (Spring)
- 278 International Business Negotiations (3)** Ghadar  
Characteristics and process of International Business Negotiations (IBN). Formulation of concepts and preliminary frameworks, development of systematic approaches to planning for and conducting IBN. Integration of other functional and international aspects in the broader environmental framework. Prerequisite: IBus 261. (Fall and spring)
- 290 Special Topics (3)** Staff  
Experimental offering, new course topics and teaching methods. May be repeated once for credit.
- 298 Directed Readings and Research (3)** Staff  
Supervised readings or research in selected fields within business administration. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.
- 361 Colloquium on International Business (3)** Eldridge, Ghadar  
Examination of selected topics in international business, with emphasis on major new theoretical and empirical developments. (Fall)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to doctoral candidates. May be repeated for credit.

## LATIN AMERICAN STUDIES

**Program Committee:** P.F. Klarén (Director), C.J. Allen, Y. Captain-Hidalgo, C. McClure, M. Moore, J. Quiroga, J. Troacy, R. Valero

The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of Latin American studies

**Master of Arts in the field of Latin American studies—Prerequisite:** the admissions requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School of International Affairs.

The program offers a 30-credit-hour option with a thesis or a 36-credit-hour option without a thesis. All students must take the interdisciplinary seminar, IAff 287. Programs in Latin American Civilization. (Students with no previous course work in Latin American history, politics, literature, geography, or anthropology should consult with the program director to determine ways to acquire the necessary background.)

All students must demonstrate proficiency in Spanish or Portuguese through a reading comprehension examination. For students whose native language is Spanish or Portuguese, an English language examination will be substituted.

Degree candidates who choose the thesis option must take Master's Comprehensive Examinations in two fields. This can include one major field (12 credit hours) and one minor field (6 credit hours), or it can be two major fields (9 credit hours each).

Those who select the nonthesis option must take Master's Comprehensive Examinations in three fields, which can include one major field (12 hours) and two minor fields (6 hours each).



each) or two major fields (9 hours each) and one minor field (6 hours). One minor field may be selected from demography, international business, rural development, urban and regional planning, tourism administration, women's studies, and science, technology, and public policy. At least two courses must be research seminars requiring a substantive paper.

The following graduate courses pertain to Latin American studies.

- Anth 268 Seminar: *Peasant Society*
- Anth 272 Seminar: *Topics in Latin American Anthropology*
- Anth 282 Seminar: *Advanced Archaeology—New World Prehistory*
- Econ 251 *Economic Development Theories*
- Econ 252 *Economic Development Planning*
- Econ 283-84 *Survey of International Economic Theory and Practice*
- Econ 285-86 *Economic Development of Latin America*
- Geog 223 Seminar: *The Population—Food Balance*
- Geog 250 Seminar: *Regional Development*
- Geog 261 Seminar: *Geography of Latin America*
- Hist 261-62 *Readings/Research Seminar: Topics in Modern 20th-Century Latin America*
- IAH 287 *Problems in Latin American Civilization*
- PSc 283 *Governments and Politics of Latin America*
- PSc 284 *International Relations of Latin America*

## LEGISLATIVE AFFAIRS

Academic Director C.J. Deering

The Graduate School of Arts and Sciences offers a program leading to the degree of Master of Arts in the field of legislative affairs. This program focuses on the U.S. Congress with emphasis on the legislative process, American political institutions, and public policy analysis.

**Master of Arts in the field of legislative affairs—Prerequisite:** a bachelor's degree with a B average from an accredited college or university

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The curriculum of 33 hours of course work includes two courses from each of the four groups listed below. The remaining courses are selected in consultation with the advisor. All students must pass a Master's Comprehensive Examination.

- Group I—*Legislative Process*: PSc 218, 234
- Group II—*The Processes of Politics*: PSc 215, 216, 219, 220, 221, 226, 227, 228, 246, 286
- Group III—*Public Policy Analysis*: PSc 212, 222, 224, 225, 249, 250, WStu 240
- Group IV—*Legislative Research and Analysis*: PSc 200, 203

## MANAGEMENT SCIENCE

Professors P.B. Vaill, I.B. Harvey, W.E. Halal, E.H. Forman, S.A. Umpheby, J.F. Lobuts, Jr., J.D. Frame, E.K. Winslow (Chair), J.H. Carson, N.M. Loeser, B. Burdetsky, P.W. Wirtz  
 Associate Professors W.W. Hardgrave, J.P. Coyne, L.E. Graff, T.J. Nagy, W.G. Wells, Jr., W.J. Becker, J. Liebowitz, J.M. Cary, R.G. Donnelly, R. Soyer, P.B. Malone III, M.S. Katzman,  
 C.N. Toftoy (Visiting)  
 Instructor B. Forst (Visiting)

See the School of Business and Public Management for programs of study leading to the degrees of Master of Business Administration, Master of Science in Information Systems Technology, and Doctor of Philosophy. Departments in the School of Business and Public Management have been restructured, and many courses have new designations and numbers.

### 201 Organization and Management (3)

(Formerly Mgt 205)

For designated students in the M.B.A. program. Integrative approach to organizational concepts, management principles, philosophy, and theory in public and private organizations. Evolution of management thought, functions, and prac-

Vaill, Halal, Loeser

- tices, stressing present management approaches, general systems theory, and contingency management. (Fall, spring, and summer) Halal, Adams
- 202 Management of Strategic Issues (3)**  
(Formerly Mgt 201)  
The body of management theory and practice that has evolved recently to identify, analyze, and resolve strategic organizational issues. A survey of the methodology of the field, applications to critical issues in labor relations, energy and pollution, marketing and consumerism, business-government relations, and the global economy. Prerequisite: Mgt 201 or equivalent. (Spring and summer) Halal
- 203 Strategic Planning (3)**  
(Formerly Mgt 206)  
Formulation of strategies that enable organizations to adapt to changing social, technological, economic, and political conditions. Lectures, discussion, and exercises examine strategic planning practices and the environmental changes affecting corporations, government agencies, hospitals, and other major institutions. Students conduct a strategic planning project for an organization. (Fall) Loesser, Malcom
- 204 Human Resources Management (3)**  
(Formerly BAd 210)  
Survey of personnel management practices and procedures, including labor-management relations. Same as PAd 231. (Fall and spring) Burdetsky, Katzman
- 205 Seminar: Human Resources Management (3)**  
(Formerly BAd 211)  
Industrial personnel and manpower management, research in advanced problems. (Spring) Malcom
- 206 The Human Resources Manager (3)**  
(Formerly BAd 212)  
The personnel manager and his or her place in the organization, relation to other executives, policy role, and relations with chief executive. Problems of the personnel executive. Prerequisite: Mgt 204 or permission of instructor. Same as PAd 232. (Summer) Loesser
- 207 Leadership and Executive Development (3)**  
(Formerly BAd 215)  
Theories of managerial leadership, issues and problems associated with leadership in large organizations and at higher management levels—executive development and development. Prerequisite: Mgt 201 or permission of instructor. (Fall and spring) Burdetsky
- 208 Unionism and Collective Bargaining (3)**  
(Formerly BAd 217)  
The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements. (Fall) Burdetsky
- 209 Current Issues in Unionism, Collective Bargaining, and Labor Relations (3)**  
(Formerly BAd 218)  
Current problems and issues. (Spring) Harvey, Winslow, Vaill, Lobots
- 210 Individual and Group Dynamics in Organizations (3)**  
For graduate students who wish to improve their skills in dealing with human behavior in organizations. The course is designed to improve theoretical and personal understanding of the roles of interpersonal and group dynamics in management. Focus on individual and group behavior in various organizational settings. (Fall, spring, and summer) Winslow, Lobots
- 211 Current Issues in Organizational Behavior (3)**  
Study of behavioral factors relating to issues such as automation, ethics, interpersonal relations, organizational change, and similar problems in organizational settings. Problems of conducting behavioral science research in organizations. (Fall) Harvey, Winslow
- 212 Behavioral Factors in the Process of Change (3)**  
Review of research, theory, and practice related to the process of human change. Students are provided the opportunity to apply their learning, using various media. This course emphasizes the relationship between theory and practice. (Fall, spring, and summer)



- 213 Organization Development:  
A Management Function (3)**  
An exploration of the literature, culture, values, and skills that can assist a manager, leader, or administrator in carrying out the process of organizational development. Emphasis is on direct managerial intervention, although the role of consultants/facilitators in the process is explored. (Fall)  
Lobuts, Harvey, Vaill
- 214 Behavioral Factors in  
Management Consulting (3)**  
Theories and methods of planning, introducing, and coping with change in management through the helping process. Intended both for managers seeking an understanding of the consultative approach to planned change and for persons in staff or consultative roles seeking understanding of the consultative process. (Spring)  
Harvey, Vaill, Lobuts, Winslow
- 215 Conflict Management:  
Theory, Concepts, and Methods (3)**  
Exploration of various approaches to the causes of conflict and its resolution. Students study and experience ways to make conflict a creative rather than a destructive experience. Methods of conflict resolution are practiced. Conflict in the micro (person-to-person) and macro (system-to-system) levels are explored. Prerequisite: Mgt 210 or permission of instructor. (Fall and spring)  
Lobuts, Harvey, Winslow
- 216 Cross-Cultural Management (3)**  
This course focuses on the variety of issues and opportunities that arise when managing outside one's own culture. The manager's credibility and effectiveness are assumed to be culture bound. Emphasis on the personal level as opposed to the interinstitutional or intercultural levels. Extensive use of student experiences and research. (Summer)  
Vaill
- 217 Entrepreneurship (3)**  
(Formerly Mgt 208)  
In exploring the "entrepreneur as a phenomenon," students will be exposed to the theory and experiences associated with entrepreneurs, entrepreneurial acts, and entrepreneurship in all organizational settings—large, small, public, and private. Prerequisite: Mgt 201 or permission of instructor. (Fall and spring)  
Winslow, Solomon
- 218 Computer Applications in Production/  
Operations Management (3)**  
For designated students in the M.B.A. program. Fundamentals of production operations management. Inventory management, resource allocation, production planning, project management, and forecasting. Linear programming, queuing analysis, spreadsheets, database systems, BASIC. Principles, terminology, and organization of computer systems. (Course equivalent MLOM 188 and Mgt 58.) (Fall, spring, and summer)  
Forman, Graff, Forst, Soyer
- 220 Analytical Models for Decision Making (3)**  
Survey of analytical models used for decision making. Topics cover both probabilistic and deterministic models and include linear and integer programming, decision theory, multicriteria decision analysis, queuing and network models. Applications from literature are presented. Prerequisite: Mgt 218 and 270 or equivalent. (Fall and spring)  
Forman, Soyer
- 221 Introduction to Probability Theory  
and Applications (3)**  
Introduction to probability theory and its applications in management science and operations research, foundation course for further study of advanced probabilistic methods in operations research. Sample spaces, conditional probability, common distributions, random variables, simple stochastic processes. Prerequisite: Math 42 or 52 or equivalent. (Alternate years)  
Hardgrave, Forman, Wirtz
- 222 Mathematical Programming:  
Techniques and Applications (3)**  
Technical and applied considerations of linear programming and related methods. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to integer programming, algorithms, and formulations. Prerequisite: Math 42 or 52 or equivalent. (Alternate years)  
Hardgrave, Forman, Graff
- 223 Techniques of Operations Research (3)**  
Survey and introduction to contemporary operations research techniques, including nonlinear programming, dynamic programming, inventory and queuing

- models, and simulation. Applications of such methods as models of command processes. **Prerequisite:** Mgt 221, 222. (Alternate years) **Forman, Soyars**
- 224 Foundations of Decision Making (3)**  
Concepts and methods for making complex decisions in both business and government; identifying criteria and alternatives, setting priorities, allocating resources, strategic planning, resolving conflict, and making group decisions. (Fall and spring) **Wirtz, Graff, Forman**
- 225 Statistical Modeling and Analysis (3)**  
The process of specifying, analyzing, and testing models of human and system behavior. Formalization of models; statistical test comparison and selection; computer implementation of univariate, bivariate, and multivariate tests; general linear model; linear regression; analysis of variance, and analysis of covariance. **Prerequisite:** Mgt 270 or equivalent. (Fall and spring) **Graff**
- 226 Workshop in Computerized Decision Systems (3)**  
Framework, processes, and technical components for building decision support systems dealing with unstructured and underspecified problems from managerial and organizational perspectives. Construction and exploration of decision support system models. **Prerequisite:** Mgt 220 or permission of instructor. (Spring) **Forman, Hardgrave, Soyars**
- 229 Decision Making in Practice (3)**  
Problem identification, design, evaluation, and choice of decisions in public, private, and nonprofit sectors. **Prerequisite:** Mgt 220, 224, and 225 or permission of instructor. (Alternate years) **Donnelly, Wells**
- 230 Management of Technology Innovation (3)**  
Competitive, economic, and political factors that influence technology innovation in public and private organizations, domestically and internationally. Management of research and development; project selection, resource allocation; technology planning, management of development projects. Quality, manufacturing, and intellectual property issues. Corporate venture divisions. (Fall and spring) **Wells, Frame**
- 231 Project Management (3)**  
Practical examination of how projects can be managed from start to finish, including specific emphasis on planning and controlling to avoid common pitfalls. Identifying needs, defining requirements, project costing, scheduling, resource allocation, and project politics. Configuration management, microcomputer applications. (Fall, spring, and summer) **Frame, Wells**
- 232 International Science and Technology (3)**  
Technology transfer among advanced countries and LDCs. Comparative science and technology policies and capabilities of countries. Technology basis for international trade, licensing, patenting, and joint ventures. Global transfer of military technologies and export controls. Technology in economic development. (Fall, spring, and summer) **Halal, Frame**
- 233 Emerging Technologies (3)**  
Exploration of new developments in scientific and technological innovation, including automation, energy, medicine, bioengineering, social science, information technology, and space. Emphasis on forecasting these technological advances and assessing their economic and social effects. The role of advancing technology in driving social change. (Spring) **Donnelly, Frame**
- 235 Technology Entrepreneurship and Innovation (3)**  
The process of innovation and entrepreneurship used to launch and build new ventures. Organizing for innovation, raising venture capital, tax considerations, managing the small technology-based venture, marketing technology, case studies of recent low- to high-tech ventures. Developing a business plan for a technology-based venture. (Spring and summer) **Donnelly, Wells**
- 239 Seminar: Competitiveness and Technology (3)**  
Capstone course integrating the field of management of science, technology, and innovation. Commercialization of technology in the private sector and the impact on competitiveness. Implementation of technology in the public sector. Technology development, from new product concept to utilization. A major simulation. **Prerequisite:** 6 credits in related subjects or permission of instructor. (Fall)



- 240 Survey of Information Technology (3)** Graff, Carson, Liebowitz, Wenker, Coyne  
Management-oriented survey of key areas in information technology, including hardware, software, systems development, management, and the computing milieu. Prerequisite: Mgt 218 or permission of instructor. (Fall, spring, and summer)
- 242 Systems Analysis for Information Systems (3)** Carson, Wenker, Liebowitz, Coyne  
Development of a specification for an information system. Topics include CASE tools, data gathering, information flow modeling, object-oriented analysis, data file organization, input/output and other nonfunctional requirements, such as performance reliability, environmental conditions, and training. Prerequisite: Mgt 240. (Fall and spring)
- 243 Human Factors in Information Systems (3)** Nagy, Coyne, Cary  
The user-computer interaction, human factors of on-line dialogues, interfacing, and various approaches to user-system interaction. Emphasis on the development and evaluation of user-computer interfaces using artificial intelligence software. Prerequisite: Mgt 240. (Fall and spring)
- 244 Telecommunications: Technology, Applications, and Operations (3)** Cary  
Basic technical concepts, applications, and trends of telecommunications; operations, cost considerations of implementing telecommunications systems. Prerequisite: Mgt 240. (Fall and spring)
- 245 Database Management for Information Systems (3)** Coyne, Cary  
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Designing databases for business applications and implementing such databases using commercially available packages. Prerequisite: Mgt 240. (Fall and spring)
- 249 Seminar in Hypermedia Information Systems (3)** Coyne, Graff, Wenker  
Current trends in the design and implementation of hypermedia information systems. Integration of database, text, image, voice, video, and knowledge. Experience in computer-based hypermedia information systems. (Fall and spring)
- 253 Information Security Systems (3)** Wenker, Cary  
An advanced course in information technology, emphasizing the philosophies, principles, and practices of security management in and impact of privacy legislation on computer-based systems. Risk assessment, state-of-the-art measures, trends in the information security field, and roles of the various levels of management and technological staff. Prerequisite: Mgt 218 or 240. (Spring)
- 255 Applied Expert Systems (3)** Nagy, Liebowitz  
Students build an expert system that performs monitoring, diagnosis, classification, scheduling, planning, etc., and tolerates incomplete or inexact inputs. Prerequisite: Mgt 240 or permission of instructor. (Fall, spring, and summer)
- 261 Introduction to Systems Theory and Cybernetics (3)** Umpleby  
Systems theory and cybernetics provide principles that govern information processing and decision-making activities, whether these occur in human beings, machines, or social organizations. The course covers ways of conceptualizing systems, strategies for regulating systems, and paradoxes involved in self-regulation. (Fall)
- 262 Methods for Making Organizations Adaptive (3)** Umpleby  
An adaptive organization must solve day-to-day problems and periodically restructure itself to meet new challenges and opportunities. The course reviews several strategies for conducting a group planning process and introduces several models of ideal organizations. Students conduct an interactive planning process with people in an organization. (Spring)
- 264 System Dynamics Modeling (3)** Umpleby  
Computer modeling of organizational problems using system dynamics and the dynamic programming language. Review of previous applications of system dynamics. Causal influence diagrams, level and rate diagrams, equations, testing, and analysis. In conjunction with people in an organization, students develop a system dynamics model of some aspect of the organization. (Fall)
- 265 Artificial Intelligence and Cybernetics (3)** Umpleby  
Artificial intelligence entails building computers that simulate human behavior. Cybernetics provides a theory of cognition that can aid designing software and

- assessing implications of new computer technology for individuals and organizations. Theoretical and philosophical literature on the prospects for automated intelligent behavior. (Spring) Forman, Graff, Hardgrave, Wirtz, Nagy
- 270 **Mathematics and Statistics for Management (3)**  
For designated students in the M.B.A. program. Mathematical and statistical concepts employed in the solution of managerial problems. Applications of functions, elements of calculus and linear algebra. Introduction to probability, frequency distributions, statistical inference, and regression and correlation. (Fall, spring, and summer)
- 275 **Advanced Statistical Modeling and Analysis (3)** Hardgrave, Wirtz  
Advanced topics associated with the general linear model. Testing for remediation of assumption violations. Detection of outliers, influential observations, and multicollinearity. Alternative design strategies in the analysis of variance; a priori and a posteriori tests; testing for interactions and parallelism. Prerequisite: Mgt 225 or permission of instructor. (Fall and spring)
- 276 **Exploratory and Multivariate Data Analysis (3)** Hardgrave, Wirtz  
Methods for exploratory data analysis. Application and comparison of advanced multivariate analytical procedures. Multivariate and discriminant analysis, canonical correlation, and maximum likelihood latent structure analysis. Prerequisite: Mgt 225 or permission of instructor. (Spring)
- 280 **Information Systems Development and Applications (3)** Cary, Carson  
Each stage of the information systems life cycle is discussed in terms of techniques, impact, and management. Topics include structured analysis, prototyping, software reuse, testing, life-cycle costs, software development environments, organizational and behavioral aspects of development projects. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)
- 281 **Foundations of Artificial Intelligence (3)** Wirtz, Nagy, Liebowitz, Carson  
Logical foundations, components, and processes of automated reasoning systems. Alternative inference rules. Introduction to predicate calculus, recursion, and lists. Students use the computer to solve problems in an artificial intelligence language. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall)
- 282 **Information Systems and Telecommunications (3)** Cary, Carson  
Telecommunications and networking as applied to enterprises in the commercial and public sector. A survey of the technologies and applications of telecommunications systems. Emphasis on selection of the proper technologies and configurations necessary to support business applications. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)
- 283 **Topics in Higher Level Languages (3)** Carson, Nagy, Wirtz  
Emerging high-level languages, such as PROLOG, SMALLTALK, C, and C++, used to develop information systems. Not all languages are offered every semester; programming assignments are made in the languages studied. May be repeated once with advisor's approval. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall and spring)
- 284 **Database Systems (3)** Coyne, Liebowitz  
Use of the latest techniques for developing and implementing an effective database system. Topics include database organization, creation, and maintenance; evaluation criteria; standardization of database systems; and analysis of the state of the art in database development. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall and spring)
- 285 **Workshop in Database and Expert Systems (3)** Coyne, Liebowitz  
Analysis and solution of complex information problems through commercial available database and expert systems; development of evaluation methodology; comparison of implementation strategies. Hands-on experience with major commercial systems. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall and spring)
- 286 **Operating Systems (3)** Carson  
Survey of operating systems and related technologies. Emphasis on aspects of operating systems, such as security, file structures, scheduling, and interprocess communication that affects the design of information systems. The Unix OS, MV/CMS, and VAX/VMS systems are presented. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall)



- 287 **Design of On-Line Information Systems** (3) Carson, Cary  
Analysis, design, and implementation of on-line information systems. Topics include systems analysis, database design, dialog design, response time and reliability calculations, system testing and project planning. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)
- 288 **Applied Artificial Intelligence Programming** (3) Nagy, Wirtz, Liebowitz  
Use of programming methods and knowledge representations originating in artificial intelligence (e.g., executable specifications, rules, frames, objects, neural networks) to develop systems. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Spring)
- 290 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit
- 291 **Knowledge Acquisition** (3) Coyne, Liebowitz, Nagy, Wirtz  
Knowledge acquisition is often the biggest problem in expert systems development. The ability to acquire knowledge from the expert requires both technical and interpersonal skills. This course is aimed at explaining some of the barriers to acquiring knowledge and discusses techniques to overcome them. Prerequisite: Mgt 281 or permission of instructor. (Fall)
- 292 **Applied Artificial Intelligence and Neural Networks** (3) Liebowitz, Coyne, Nagy, Wirtz, Cary, Carson  
Topics include neural networks, machine learning, speech understanding, parallel processing, object-oriented programming, and knowledge representation. Prerequisite: Mgt 281 and 288 or permission of instructor. (Spring)
- 298 **Directed Readings and Research** (3) Staff
- 299 **Thesis Seminar** (3) Staff
- 300 **Thesis Research** (3) Staff
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3) Staff  
Same as SMPP 311.
- 328 **Seminar: Operations Research** (3) Hardgrave  
Special topics and advanced applications in operations research, such as catastrophe theory, Markovian decision processes, or applications of the calculus of variation in economics and finance. May be repeated once for credit. Prerequisite: Mgt 223 or permission of instructor.
- 365 **Seminar in Cybernetics and General Systems Theory** (3) Umpleby  
A review of recent literature in the field, guiding questions that have led to the development of general systems theory and cybernetics, comparison of these theories with other approaches to understanding organizations and management. Prerequisite: Mgt 262. (Spring)
- 385 **Special Topics in Research Methods** (3) Harrell, Wirtz  
Research problems and issues related to student dissertations form topics for readings, group discussions, and assigned papers. (Fall and spring)
- 390 **Philosophical Foundations of Administrative Research** (3) Vaill  
Philosophy of science as applied to research in administration. Topics include the nature and current problems of epistemology, the development and role of theories, and the relationship between theory, methodology, and empirical data. (Fall and spring)
- 391 **Methodological Foundations of Administrative Research** (3) Wirtz, Newcomer, Harrell  
Examination of the process of social science research. Use of models and theoretical frameworks in research, formulation of research questions, hypotheses, operational definitions, research design, sampling methods, and data analysis approaches. Primary emphasis on the development of dissertation proposals. (Fall and spring)
- 398 **Advanced Reading and Research** (arr) Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit
- 399 **Dissertation Research** (arr) Staff  
Limited to doctoral candidates. May be repeated for credit.

# MARKETING, LOGISTICS, AND OPERATIONS MANAGEMENT

Professors S.F. Divita, R.F. Dyer, S.N. Sherman, J.H. Perry

Associate Professors R.L. Holland, M.L. Liebrez-Himes (Chair), L.M. Maddox, P.K. Beggs

Assistant Professor S.S. Hassan, P.A. Rau

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy. Please note that the following courses were formerly offered by the Business Administration Department

## 240 Marketing Management (3)

Dyer, Divita, Liebrez-Himes, Hassan

This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Emphasis on the marketing process from the viewpoint of the firm. Market analysis, product planning, channels of distribution, pricing, and promotional decision making; developing an integrated marketing plan. Prerequisite: Econ 217-18. (Fall, spring, and summer)

## 241 Advanced Marketing Management (3)

Divita, Liebrez-Himes, Rau

For M.B.A. students in concentrations other than marketing. Case analyses of complex marketing problems. Current developments in marketing practice. The relationship of marketing to environmental forces and other business functions. Prerequisite: MLOM 240. (Fall and spring)

## 242 Buyer Behavior (3)

Dyer, Hassan, Maddox

A required course for marketing students. The buyer decision process model as a framework for analysis of how and why products and services are purchased and used. The impact of consumer decisions on the marketing strategies of organizations. Marketing applications in high-tech and service industries. Prerequisite: MLOM 240. (Fall and summer)

## 243 Marketing Research (3)

Dyer, Rau

The marketing research process: designing, conducting, and using market research studies. Managing the market research project, qualitative research, survey and experimental designs; data analysis with statistical software packages. Prerequisite: MLOM 240, Mgt 218 and 270. (Fall and summer)

## 246 Marketing of Services (3)

Liebrez-Himes

Management of the activities involved in marketing new and existing services. The innovation system (behavioral and organizational) of service product decisions, product planning processes, marketing auditing, services and the law, and new service trends. Marketing of intangibles and services is highlighted. Prerequisite: MLOM 240. (Spring)

## 248 Advertising and Sales Promotion (3)

Maddox

Examination of advertising and sales promotion from a systems perspective supported by analytical methods and concepts regarding consumer attitudes and behavior. The role of communication in marketing, behavioral research, message design, economic and financial criteria, development of a promotion program. Prerequisite: MLOM 242. (Spring and summer)

## 250 Selling and Sales Management (3)

Divita

The selling task, with attention to ethical and legal issues, the selling process, account management, negotiation. Managerial issues, demand analysis and resource allocation, financial planning, quota setting and control, motivation, coaching and incentives, sales administration, and analysis of sales performance. Prerequisite: MLOM 240. (Fall and spring)

## 253 Marketing Channels (3)

Stat

Marketing channels as super-organizations: planning, organization, coordination, and control. The channel's task environment: manufacturing, wholesaling, retailing, and physical distribution institutions. System performance and management of interorganizational relationships among channel institutions. Prerequisite: MLOM 240. (Fall)

## 255 Marketing High Technology (3)

Divita

Emphasis on differentiating the marketing process used for marketing high technology and high technology products from that employed by firms offering a standard product line. Market analysis, product planning, channels of distribution, pricing, promotion, decision making, and developing an integrated marketing plan. Primarily for M.S. in I.S.T. students.



- 257 Marketing and Public Policy (3)** Divita  
Examination of principal areas of public policy formulation affecting marketing practice. Topics: advertising, warranties, product safety, health issues, consumer information systems, informal and formal redress mechanisms, business responsibilities. Government, business, and advocate viewpoints presented. Prerequisite: MLOM 240 or permission of instructor. (Fall)
- 259 Marketing Strategy (3)** Divita, Rau  
A required course for marketing students. Analysis of complex marketing problems involving policy and operational decisions, emphasis on creative marketing strategy. Prerequisite: completion of at least three Second-Level marketing courses or permission of instructor. (Spring)
- 280 Purchasing and Materials Management (3)** Perry, Sherman, Bagchi  
Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics. Same as PAd 280. (Fall and spring)
- 281 Procurement and Contracting (3)** Sherman  
Principles and concepts essential to effecting large procurement programs. Planning, sourcing, and contractual design for diverse acquisitions. Emphasis on federal government policy with comparison of buying at other governmental levels and the private sector. Same as PAd 281. (Fall and spring)
- 282 Government Contract Administration (3)** Sherman  
Surveillance and management of contract performance. Measurement of progress, specification interpretation; quality assurance; changes, negotiation, and adjustment, financial considerations, property; terminations; regulatory and policy concerns. Same as PAd 282. (Spring)
- 283 Pricing and Negotiation (3)** Sherman  
Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations, analysis of cost, price, profit, investment, and risk; cost principles; incentives, relationship of contract type to work requirements; techniques of negotiation. Same as PAd 283.
- 285 Systems Procurement and Project Management (3)** Perry, Sherman  
Major systems acquisition needs, objectives, organizational relationships, and systems engineering concepts. Design, establishment, and execution of project management plans and procurement processes. Analysis of cases in public- and private-sector contracting. Same as PAd 285. (Fall and spring)
- 286 Physical Distribution Management (3)** Bagchi  
Transportation and communications services management, optimization of cost and service. Alternatives available to the manager given the economic situation, competitive conditions, and regulatory environment of the several transportation modes. Model location theory and distribution network planning and design. (Spring)
- 287 Manufacturing Control Systems (3)** Bagchi, Perry  
Inventory and production control concepts, techniques, and strategies for effective integration with basic finance, marketing, and manufacturing objectives. Forecasting methods, material requirements planning systems, distribution requirements planning techniques, and classical reorder-point inventory models. (Fall)
- 288 Logistics Management (3)** Bagchi, Perry  
Management of work in production, commercial, service, and public organizations. Analytical tools for planning and establishing operating systems and for their operation, control, and modification. Examination of processes, products, services, equipment, and facilities. Relationships of human systems and operating systems. (Fall)
- 289 Manufacturing Strategy (3)** Bagchi, Perry  
Basic production methods and techniques that influence formulation of a firm's strategic policy. Traditional and updated and improved systems for controlling capacity and output. Examination of productivity analysis, cost control, materials planning, and other topics to ensure that the production function contributes to overall profit. (Spring)
- 290 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.

- 298 **Directed Readings and Research** (3)  
 299 **Thesis Seminar** (3)  
 300 **Thesis Research** (3)  
 311 **Seminar: Public-Private Sector Institutions and Relationships** (3)  
 Same as SMPP 311.  
 341 **Seminar: Marketing** (3) Dyer, Liebrech-Him  
 Examination of major theoretical developments in marketing. (Fall, spring)  
 381 **Seminar: Materials and Operations Management** (3) Bagchi, Perry, Sherman  
 Recent developments in manufacturing production and materials management; impact of technological economic and social change; significant related trends; Private- and public-sector policy implications. New and emerging analysis techniques. Prerequisite: MCOM 280, 281, or permission of instructor.  
 396 **Advanced Reading and Research** (arr.)  
 Limited to doctoral candidates preparing for the general examination. May be repeated for credit.  
 399 **Dissertation Research** (arr.)  
 Limited to doctoral candidates. May be repeated for credit.

## MATHEMATICS

Professors T.P.G. Laverman, H. Kenyon, I. Katz (Chair), H.D. Junghenn, I.I. Glick  
 Associate Professors M.P. Lee, E.A. Stone, M.M. Gupta, E.A. Robinson, R. Simon  
 Assistant Professors F.E. Baginski, D.H. Ullman, V. Harizanov, K.G. Hockett, J. Benin

**Master of Arts in the field of mathematics**—Prerequisite: a bachelor's degree with a major in mathematics from this University, or an equivalent degree.

Required: the general requirements stated under the Graduate School of Arts and Sciences. Students must complete 30 credit hours of approved course work, with or without a thesis, and must pass a comprehensive examination.

**Master of Arts or Master of Science in the field of applied mathematics**—Prerequisite: a bachelor's degree with a major in mathematics or a related field such as statistics, a physical science, engineering, or economics.

Required: the general requirements stated under the Graduate School of Arts and Sciences. Course work is divided between mathematics courses and courses from one area of application—economics, engineering (civil, electrical, or mechanical engineering), operations research; or engineering management), physics, statistics, or urban and regional planning. Courses in the chosen area of application are selected in consultation with the relevant department.

Candidates for the degree of Master of Arts or Master of Science in the field of applied mathematics must complete 30 credit hours of approved course work, which may include Math 299–300 Thesis Research, and must pass a comprehensive examination. At least 10 credit hours must be in mathematics courses, with no more than 6 hours of these from approved second-group courses. The remaining courses are chosen from the selected area of application. Theses are jointly supervised by the Department of Mathematics and the department concerned with the area of application. There is no thesis requirement.

**Doctor of Philosophy in the field of mathematics**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The department doctoral program committee, after consultation with the student, will stipulate (1) courses that must be taken to fulfill the 48-credit-hour requirement leading to the General Examination; (2) the two languages, selected from French, German, or Russian, to satisfy the foreign language requirement; and (3) the four areas of study in which the student must prepare for the General Examination. The doctoral program committee will appoint a Director of Research when the student has selected (preferably early in the program) one of the following research fields for the dissertation: functional analysis (abstract differential equations, generalized functions, groups of operators), group representations, linear algebra (matrix theory), logic, theory of computability, measure and integration, numerical analysis, ordinary and partial differential equations, combinatorics, graph theory, ergodic theory, dynamical systems, semigroups, and topology (general topology, analytic topology, topological groups).



With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

201-2 **Modern Algebra I-II** (3-3)

Katz

Group theory including symmetric groups, free abelian groups, finitely generated abelian groups, Sylow theorems, solvable groups, nilpotent groups. Ring theory including factorization in commutative rings, rings of polynomials and formal power series, chain conditions, semisimple rings, Wedderburn-Artin theorems, primary decomposition, Dedekind domains (Academic year)

203 **Modern Algebra III** (3)

Katz

Algebraic and transcendental field extensions, splitting fields, normal extensions, fundamental theorem of Galois theory, solvability by radicals, valuation theory. (Fall, odd years)

204 **Representation Theory** (3)

Lee

Representations of finite groups, including symmetric group, group characters, and induced representations. Prerequisite: Math 202. (Fall)

205 **Matrix Theory** (3)

Katz

Topics to be chosen from generalized inverses of matrices and their applications to solutions of equations and to LP problems, positive definite matrices and their applications; Riemann matrices, linear groups; quadratic forms and Hilbert's eleventh problem; numerical range of linear operators (Spring, even years)

206 **Topics in Algebra** (3)

Staff

May be repeated for credit.

209-10 **Theoretical Methods in Classical and Quantum Physics** (3-3)

Staff

Joint offering of the Mathematics and Physics Departments. Topics covered include solutions of partial differential equations encountered in physics, techniques of linear algebra, calculus of variations, complex analysis, applications in physics of the theory of analytic functions, integral equations, and group theory in physics

211 **Complex Analysis I** (3)

Glick and Staff

Topology of complex numbers, elementary functions, integrals, Cauchy's theorem, maximum modulus and Liouville theorem, Taylor and Laurent series; classification of singularities; contour integration, the residue theorem; continuation, multivalued functions, and branch points. Prerequisite: advanced calculus (Spring)

212 **Complex Analysis II** (3)

Glick and Staff

Harmonic functions, partial fractions, Mittag-Leffler theorem; entire functions, the Hadamard product theorem, the gamma function, Hurwitz's theorem, normal families of functions. The Riemann mapping theorem, analytic continuation, Riemann surfaces. Prerequisite: Math 211 or equivalent (Spring, even years, when demand warrants)

213 **Applications of Complex Analysis** (3)

Liverman and Staff

Topics chosen from potential theory and conformal mapping, special functions, asymptotic expansions, steepest descent, stationary phase, and WKB methods, Fourier and Laplace transforms, Wiener-Hopf method, dual and singular integral equations. Prerequisite: Math 211 or an undergraduate course in complex variables. (Spring, odd years, when demand warrants)

214 **Measure and Integration Theory** (3)

Ullman and Staff

Lebesgue measure and integration in abstract spaces. Probability measures. Absolute continuity; Radon-Nikodym theorem; measure on product spaces; Fubini theorem.  $L^p$  spaces. Prerequisite: advanced calculus (Fall)

215 **Introduction to Functional Analysis** (3)

Robinson and Staff

Topological and metric spaces, Tychonoff theorem, Banach spaces, linear functionals and operators; Hahn-Banach closed-graph and open-mapping theorems; uniform boundedness; Hilbert spaces, eigenvalues, projections. Prerequisite: advanced calculus (Spring)

216 **Banach Algebras and Spectral Theory of Operators** (3)

Robinson

Gelfand theory of commutative Banach algebras, function algebras, Stone-Cech compactification, application to the spectral theory of operators, spectral theorem for bounded and unbounded operators. Prerequisite: knowledge of measure and integration, introduction to functional analysis, and Tychonoff and Stone-Weierstrass theorems. (Fall, odd years, when demand warrants)

- 217 Introduction to Ordinary Differential Equations (3)**  
First course in ordinary differential equations: existence and uniqueness of solutions; continuity of solutions with respect to initial conditions; properties of linear systems. **Prerequisite:** advanced calculus. (Spring)
- 218 Topics in Ordinary Differential Equations (3)**  
Topics selected from stability theory, nonlinear oscillations, bifurcation theory, functional differential equations. **Prerequisite:** Some background in ordinary differential equations and permission of the instructor. (Spring)
- 219 Partial Differential Equations (3)**  
Classical and modern techniques for the exact and approximate solution of PDEs. Separation of variables, Green's functions, variational methods, Hilbert space methods. **Prerequisite:** advanced calculus. (Spring)
- 220 Topics in Partial Differential Equations (3)**  
Modern techniques used in the analysis of linear and nonlinear partial differential equations. **Topics may include Sobolev spaces and their applications, a priori estimates, bifurcation theory, variational problems, weak and strong maximum principles, and traveling waves.** **Prerequisite:** Math 219 or permission of instructor. (Spring)
- 221 Calculus of Variations (3)**  
Conditions for an extremum, Euler differential equations, variational problems for multiple integrals, variable endpoint problems, and applications to physics, control theory, and geometry. **Prerequisite:** Math 140 or permission of instructor. (Spring)
- 222 Introduction to Numerical Analysis (3)**  
Computer arithmetic and round-off errors. Solution of linear systems and nonlinear equations. Interpolation and approximations. Numerical differentiation and integration. Eigenvalues and eigenvectors. **Prerequisite:** Math 33 and computer programming. (Fall)
- 223 Numerical Solution of Ordinary and Partial Differential Equations (3)**  
Initial and boundary value problems for ordinary differential equations, finite propagation, convergence and stability. Finite difference and finite element methods for partial differential equations. **Prerequisite:** knowledge of differential equations and computer programming. (Spring, alternate years)
- 224 Generalized Functions and Integral Transforms (3)**  
Laplace and Fourier transforms. Generalized functions. Green's functions. Applications to ordinary and partial differential equations. **Prerequisite:** Math 140 or permission of instructor.
- 225 Ergodic Theory (3)**  
Ergodicity, mixing, the K-property and the Bernoulli property. Poincaré recurrence, the Rohlin lemma, the ergodic theorem and entropy theory. Additional topics from isomorphism theory, spectral theory, the theory of renormalization, coding theory. **Prerequisite:** Math 214 or permission of instructor.
- 226 Dynamical Systems and Chaos (3)**  
Linear and nonlinear systems, flows, Poincaré maps, structural stability, examples of chaotic systems in the physical sciences. Local bifurcations, center manifold theory, normal forms, the averaging theorem. Hyperbolic invariant sets, strange attractors, the Smale horseshoe, symbolic dynamics. **Prerequisite:** Math 140 and 124 or permission of instructor.
- 230 Topics in Analysis (3)**  
Possible topics include, but are not limited to, ergodic theory, dynamical systems, topological groups, topological vector spaces, generalized functions and distributions. May be repeated for credit.
- 231 Topics in Applied Mathematics (3)**  
Possible topics include, but are not limited to, applications of functional analysis to nonlinear differential equations, calculus of variations, control theory, mathematical programming, applied mathematics for scientists and engineers. May be repeated for credit.
- 232 Topics in Numerical Analysis (3)**  
Numerical methods and software. Introduction to the methods, tools, and uses of numerical computation. Problem solving using standard mathematical software, such as IMSL and LINPACK. Interpolation; linear, nonlinear, and spline



- tial equations. Prerequisite: matrix theory, differential equations, and FORTRAN programming. (Spring, alternate years)
- 241-42 **Mathematical Foundations of Stochastic Processes** (3-3) Junghenn  
A mathematically rigorous study of conditional probability and expectation, martingales, stopping times, Brownian motion, and Markov processes. Prerequisite: Math 214 or the equivalent
- 261 **Combinatorics** (3) Simion  
Partially ordered sets, constructive combinatorics, tableaux, partitions. Prerequisite: Math 113, undergraduate modern algebra and linear algebra, or permission of instructor. (Spring)
- 262 **Graph Theory** (3) Simion  
Graphical enumeration, factors, algebraic graph theory, extremal graph theory, problems ranging from classical results to current research, applications. Prerequisite: Math 113, linear algebra, modern algebra, or permission of instructor. (Fall)
- 263 **Topics in Combinatorial Mathematics** (3) Staff  
May be repeated for credit.
- 271 **Mathematical Logic** (3) Harizanov  
Model theory: the relation between a formal language (syntax) and its interpretations (semantics). Consistency, completeness, and compactness. Tarski's theorem on the inexpressibility of truth. Gödel's incompleteness theorem and its impact on mathematics. (Fall, even years)
- 272 **Topics in Logic** (3) Harizanov  
Topics selected from a broad spectrum of different areas of logic and applications, based on students' suggestions and interests. May be repeated for credit.
- 281-82 **General Topology** (3-3) Kenyon and Staff  
General topological spaces, separation axioms, compactness, and connectedness. Metrization, uniform spaces, and complete spaces. (Math 281 fall)
- 287 **Differentiable Manifolds I** (3) Gluck  
Differentiable manifolds, tangent vectors, submanifolds, imbeddings and immersions, vector fields and differential equations on manifolds, tensors and differential forms, Lie derivatives, orientability. (Fall, even years)
- 288 **Differentiable Manifolds II** (3) Gluck  
Manifolds with boundary, integration on manifolds, Stokes's theorem and the divergence theorem, the Brouwer fixed-point theorem, deRham groups, Riemannian manifolds, geodesics, curvature. (Spring, odd years, when demand warrants)
- 289 **Topics in Topology** (3) Staff  
May be repeated for credit.
- 295 **Reading and Research** (arr.) Staff  
May be repeated for credit.
- 308 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 309 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## MECHANICAL ENGINEERING

See Civil, Mechanical, and Environmental Engineering.

## MICROBIOLOGY

Professors L.F. Alfronli (Chair), M. Reich, P.D. Kind, J.W. Albright, D.T. Kingsbury  
Associate Professor G.V. Stokes

Master of Science in the field of microbiology—Prerequisite: a bachelor's degree with a major in biological or physical sciences from this University, or an equivalent degree. The undergraduate program must have included the following courses or equivalent: BiSc 11-22, Chem 11-12, 151-52, 153-54; Math 30, 31 (31 may be taken concurrently with the graduate program); Phys 1, 2.  
Required: the general requirements stated under the Graduate School of Arts and Sciences. A total of 30 credit hours is required, 24 hours of course work and 6 hours of

thesis (Micr 299-300). The course work must include Biot. 221-22 and Micr 277-78. The remaining academic work should consist of graduate-level courses selected with the approval of the department.

**Master of Science in the field of clinical microbiology (supervisory track)**—A program offered jointly by the Microbiology and Pathology Departments. Prerequisite: a bachelor's degree in medical technology or in biological or physical science and a minimum of three years of experience, within the last five years, in a clinical laboratory.

Required: the general requirements stated under the Graduate School of Arts and Sciences. This is a nonthesis program requiring a total of 36 credit hours, including Biot. 221-22, Micr 225-226, Path 230, 231, 232, Micr or Path 294, and Stat 127. The remaining academic work should consist of graduate-level courses selected with the approval of the Microbiology and Pathology Departments.

**Doctor of Philosophy in the field of microbiology**—Required: the general requirements stated under the Graduate School of Arts and Sciences. The General Examination covers at least four fields, two of which must be in microbiological disciplines.

**Research fields:** immunology, pathogenic microbiology (including subdisciplines of bacteriology, parasitology, and mycology), and molecular and cellular biology (including virology, microbial physiology, and genetics).

- 225 Microbial Physiology I (3)** Reich, De Giovanni-Donnelly  
Microbial structure, nutrition, transport, growth, genetics, metabolism, and regulatory mechanisms. Prerequisite: Biot. 221-22. (Fall)
- 226 Microbial Physiology II (3)** Reich, De Giovanni-Donnelly  
The actions of antimicrobial agents and antibiotics on the structure and the chemistry of microorganisms at the cellular and molecular level. Prerequisite: Micr 225 or permission of instructor. (Spring)
- 229 Immunology (3)** Kind, Affrent  
Lecture course. Fundamental immunologic concepts. Antigens, antibodies, antigen and antibody reactions in vitro and in vivo, and the immune response. Prerequisite: Biot. 221-22. (Fall)
- 233 Virology (3)** Stokes  
Biochemical, genetic, and pathogenic characterization of viruses. Prerequisite: Biot. 221-22 or permission of instructor. (Fall)
- 234 Virology Laboratory (2)** Stokes  
Laboratory complement to Micr 233. Prerequisite or concurrent registration: Micr 233. Laboratory fee, \$20. (Fall)
- 241 Survey of Molecular Biology Techniques (3)** Stat  
Laboratory course in the basic techniques of molecular biology as they apply to analysis and manipulation of proteins and nucleic acids. (Spring)
- 258 Microbial Genetics (2)** De Giovanni-Donnelly  
Survey of microbial systems that depict basic concepts of genetic principles. (Spring)
- 260 Cellular Immunology (1)** Kind  
Advanced seminars in cellular aspects of the immune response. Content differs each time course is offered. May be repeated for credit. Prerequisite: Micr 229. (Spring)
- 277-78 Seminar: Microbiology (1-1)** Staff  
Required of graduate students. (Academic year)
- 293 Special Topics in Microbiology (arr.)** Staff  
Selected topics in microbiology. May be repeated for credit. (Fall and spring)
- 294 Research in Clinical Microbiology (3)** Staff  
Development and/or evaluation of techniques, procedures, or instrumentation related to clinical microbiology. Limited to students in the master's program in clinical microbiology. Offered jointly by the Microbiology and Pathology Departments. (Fall)
- 295 Research in Microbiology (arr.)** Staff  
Content differs each time the course is offered; may be repeated for credit. (Fall and spring)
- 299-300 Thesis Research (3-3)** Staff
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.



**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

Staff

**MUSEUM STUDIES****Committee on Museum Studies**

M.C. Malaro (Director), R.L. Humphrey, C.R. Rose, R.B. Stott, J. Vlach

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Master of Arts in the field of museum studies. The program is designed for those who seek a deepening of their primary academic interest along with training in the broad range of talents required in the successful operation of museums. The goal of the program is to produce graduates who are prepared to assume museum positions that require both scholarship and functional skills. (Students whose career interests are primarily curatorial should consider applying for the Master of Arts in their academic discipline with a concentration in museum training; those interested in museum education should refer to the Master of Arts in Teaching under the School of Education and Human Development.)

Students applying for candidacy in the Museum Studies Program must meet all general requirements for admission to the Graduate School of Arts and Sciences. The student must have an undergraduate major, or its equivalent, relevant to the proposed academic core and must show equivalent preparation.

Courses relating to museum studies are offered by other departments of the University, such as Anthropology, American Studies, Art, and Educational Leadership. With the approval of their advisor, students may draw on these courses in formulating their programs.

The Committee on Museum Studies serves the Museum Studies Program in an advisory capacity. Its members are drawn from several departments of the University and from the Smithsonian Institution.

**Master of Arts in the field of museum studies—Required:** the general requirements stated under the Graduate School of Arts and Sciences. The degree requires a minimum of 42 hours of course work. At least 15 hours of course work must be in an academic core discipline, for example, American studies, anthropology, art, biological sciences, geology and paleobiology, history, or an appropriate interdisciplinary combination. At least 15 hours of course work must be in museum studies courses that concern such functions as museum administration, collections management, exhibiting, and object care and conservation. At least 6 hours must be in a museum internship in the Washington area or elsewhere. The student must pass a comprehensive examination based on course work and submit a research paper.

**201 Introduction to Museum Studies:**

P. Spiess

**History and Philosophy of Museums (3)**

Museums viewed from historical, philosophical, and practical perspectives. Examination and comparison of types of collecting organizations. Analysis of contemporary studies on the status of museums and their public programs.

**202 Introduction to Museum Studies: Administration (3)**

Malaro

Overall operation of the museum; legal status of the museum and its obligations to the public; governance, staffing, policy-making as a nonprofit organization. Theory applied to practical situations. (Spring)

**203 Fiscal Management of Nonprofit Organizations (3)**

Olmo

Basic concepts of general accounting; fund accounting for nonprofit organizations; budgets and budget systems; use of the budget as a management tool; interest rates and risk analysis; other financial management concepts.

**215 Collections Management: Legal and Ethical Issues (3)**

Malaro

Establishing collections policies, laws, regulations, conventions, and codes that affect acquisitions, deaccessions, loans, and collection care, accountability; access problems. (Fall)

**216 Collections Management: Practical Applications (3)**

K. Spiess

The implementation of collections policies: establishing and managing collections, management procedures and systems, documentation of collections, rec-

- ords preservation, collections access and storage, handling, packing and shipping, and inventory control. (Spring)
- 270 **Museum Exhibition: Curatorial Research and Planning** (3) Bunch Sims  
Museum research from a curatorial point of view, with emphasis on exhibit conceptualization and development. Research techniques, information sources, script production. (Fall)
- 271 **Museum Exhibition: Design Processes** (3) Sims, Vollant  
The processes of research, conceptualization, planning, and evaluating. Focus on group collaboration. Visual thinking and design documentation, the vocabulary of the designer in the creative process of interpretation, project management. (Spring)
- 291 **Museum Internship** (1 to 6) Maler  
Individual work experience in museums of the Washington area and possibly elsewhere. Each student should make arrangements with the Director of the Museum Studies Program. Museum internships are supervised by one or more members of the cooperating museum staff in the areas of museum management, object care and conservation, exhibiting. (Fall, spring, and summer)
- 295 **Directed Research** (3) Starr  
Individual research on special topics in the museum field. Topics must be approved by the Director of the Museum Studies Program. May be repeated for credit. (Fall, spring, and summer)
- 297 **Special Topics in the Museum Field** (3) Starr  
May be repeated for credit provided the topic differs. (Fall, spring, and summer)

**Related courses offered by other departments:**

- AmCv 251 *Museum Research and Education*
- AmCv/Anth 294 *Field and Laboratory Research in Archaeology*
- Anth 264 *Seminar: Anthropological Museum Techniques*
- Art 209-10 *Exhibition and Display Design*
- Art/Anth 292 *Introduction to Conservation*
- Art/Anth 293 *Preventive Conservation Techniques*
- Art/Anth 212 *Advanced Conservation Techniques*
- Educ 223 *Museum Audiences*
- Educ 227 *Museum Evaluation*
- Educ 230 *Managing Computer Applications*
- Educ 240 *Proposal Writing*
- Educ/AmCv 286 *Interpretation in the Historic House Museum*
- TrDa 231 *Lighting Design*
- TrDa 234 *Advanced Scene Design*
- TrDa 235 *Special Projects in Scene Design*

**MUSIC**

Professor R. Parria

Adjunct Professor J.C. Fiorito (Voice)

Associate Professors N.A. Tilkens, R.I. Guenther (Chair)

Adjunct Associate Professor M. Garst (Piano)

Assistant Professor L. Youens

Adjunct Assistant Professors S.K. Kim (Piano), F.B. Conlon (Piano)

Studio Instructors E. Guenther (Organ), R. Parnas (Violin and Viola), M. Von Villan (Opera)

A. Robbins (Viola da gamba)

**Master of Arts in the field of music**—Prerequisite: a bachelor's degree with a major in music or an equivalent degree, satisfactory demonstration of ability in one medium of performance, demonstration of piano proficiency as required for the Department's bachelors' degrees, completion of the Department's theory placement examination

Required: the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of 36 credit hours of course work, including a thesis (6 credit hours). This program includes a required core of courses from theory, history, and performance as well as electives that may include up to two approved courses



outside the department. A student in this program must demonstrate, by formal examination, a reading knowledge of either French or German before beginning the third semester of study.

**Master of Music in the field of performance (piano or voice)—Prerequisite:** a bachelor's degree with a major in music or an equivalent degree, an audition before a faculty committee. Applicants from other institutions must present scores on the Music Subject Test of the Graduate Record Examination.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study includes 30 credit hours distributed as follows: (a) 12 credit hours of performance study in the area of concentration (piano or voice); (b) 12 credit hours of music theory and music history and literature courses; and (c) a thesis (6 credit hours). The thesis consists of a public recital and performance before a designated committee (such a recital and performance must be representative of an extensive and well-rounded repertory, performed on a professionally accepted artistic level); delivery of a historical and analytical lecture on the musical content of the recital program, also before a designated committee; a written report on some approved theoretical area related to the student's concentration; and demonstrated leadership in an ensemble performance (opera or oratorio for voice).

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

### MUSIC THEORY, HISTORY, AND LITERATURE

203	Bibliography and Research Methodology (3)	Staff
(Fall)		
205	Music of the Baroque Period (3)	Youens
	Study of the musical styles, techniques, and literature from 1600 to 1750	
206	Music of the Classical Period (3)	Tilkens
	Study of styles, techniques, and literature from the 18th-century schools through Haydn, Mozart, and Beethoven	
207	Music of the Romantic Period (3)	Guenther
	Study of the musical styles, backgrounds, and literature from Schubert through the 19th century. (Fall)	
208	Music of the 20th Century (3)	Guenther
	The principal schools, techniques, developments, and trends of the 20th century.	
221-22	Diction for Singers (3-3)	Von Villas
	Pronunciation and rules of diction for the singing of Italian, French, German, and Church Latin, making use of the International Phonetic Alphabet. (Alternate academic years)	
231-32	Composition (3-3)	Parris
	May be repeated for credit. (Academic year)	
234	Seminar: Performance Practices in Selected Areas (3)	Youens
237	Seminar: Analytical Studies in Music Theory (3)	Guenther, Parris
238	Seminar: Analytical Studies in Music History (3)	Staff
239	Independent Research (3)	Staff
251-52	Advanced Conducting (3-3)	Staff
	(Academic year)	
299-300	Thesis Research (3-3)	Staff

### APPLIED MUSIC

All courses include supervised ensemble preparation and required concert solo performances.

- 211 Piano (3)
- 213 Voice (3)
- 215 Organ (3)
- 217 Orchestral Instrument (3)

## OPERATIONS RESEARCH

Professors W.H. Marlow, D. Gross, N.D. Singpurwalla, A.V. Fiacco, G.P. McCormick, J.E. Falk, R.M. Soland (Chair)  
 Adjunct Professor R.H. Clark  
 Professorial Lecturers C. Anello, G.R. McNichols, D.R. Edmonds, J.F. Ince, S.E. Nevius, H.L. Eskew, M.F. McGrath, L.B. Anderson, A. Greenland, N.J. Plotkin  
 Associate Professor T.A. Mazzuchi  
 Associate Professorial Lecturers W.S. Lassiter, D.J. Gantzer  
 Assistant Professor T.Z. Irony  
 Assistant Professorial Lecturers M.A. Youngren, M.A. Ahmed

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

- 201 **Survey of Operations Research: Deterministic Models** (3) Falk and Staff  
 Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial, governmental, and military decision making. Linear, integer, nonlinear, and dynamic programming, networks; game theory. Prerequisite: Math 33 or permission of instructor. (Fall, spring, and summer)
- 202 **Survey of Operations Research: Stochastic Models** (3) Gross and Staff  
 Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial, governmental, and military decision making. Markov chains, queuing, inventory, reliability, forecasting, decision analysis, and simulation. Prerequisite: ApSc 115, Math 33, or permission of instructor. (Fall, spring, and summer)
- 209 **Mathematics in Operations Research** (3) Marlow, Fiacco, and Staff  
 Foundations of optimization theory: linear algebra, advanced calculus, and real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)
- 211 **Numerical Methods in Operations Research** (3) Marlow and Staff  
 Solutions of systems of linear and nonlinear algebraic equations. Approximations of functions, numerical integration, solutions of differential and difference equations, computational aspects of modeling techniques, use of software. Prerequisite: OR 209 or permission of instructor. (Spring)
- 216 **Stochastic Foundations of Operations Research** (3) Singpurwalla and Staff  
 Topics in probability theory, stochastic processes, and statistical inference. Foundations of probability, conditional probability, the Poisson process, Markov chains, and Bayesian inference. Prerequisite: ApSc 116 or permission of instructor. (Fall and spring)
- 233 **Analytic Models for Management and Administration** (3) Clark and Staff  
 Application of quantitative methods and concepts and experimental techniques taken from system theory, simulation, decision analysis, discounting, queueing, mathematical programming, and functional analysis. For graduate students outside the School of Engineering and Applied Science.
- 235 **Systems Modeling for Management and Policy I** (3) Clark and Staff  
 Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics; principles of systems employed to structure the problem-solving process. Problems and case studies solved using microcomputers. (Fall and summer)
- 236 **Systems Modeling for Management and Policy II** (3) Clark and Staff  
 Delays, feedback, prediction, and sampling in dynamic problems. Case studies in dynamic policy analysis. Use of microcomputers, electronic spreadsheets, statistics, and simulation. Includes small-group projects. Prerequisite: OR 235. (Spring)
- 237 **Logistics Planning** (3) Marlow and Staff  
 Quantitative methods in model building for logistics systems, including organization, procurement, transportation, inventory, maintenance, and their interrelationships. Stresses applications. Prerequisite: ApSc 115, Math 33. (Spring even years)
- 251 **Linear Programming** (3) Falk and Staff  
 The Simplex method and its variants considered from theoretical and computational points of view. Duality, sensitivity, and parametric programming. Large



- scale optimization. Prerequisite: OR 209 or permission of instructor. (Fall and spring)
- 252 **Nonlinear Programming I (3)** McCormick and Staff  
Basic theoretical and computational topics in optimization theory, including convexity and the optimality conditions. Algorithms for solving unconstrained, linearly constrained, and nonlinearly constrained problems. Applications. Prerequisite: OR 209 or permission of instructor. (Spring)
- 253 **Integer and Network Programming (3)** Soland and Staff  
Methods and applications of optimization problems requiring integral solutions. Implicit enumeration, branch-and-bound, and cutting plane methods. Network programming: shortest route, maximum flow, minimum cost flow, and minimum spanning tree problems. Computational complexity. Prerequisite: OR 251 or permission of instructor. (Spring, odd years)
- 254 **Applications of Linear and Nonlinear Optimization Theory (3)** McCormick and Staff  
Analysis of optimization models, including areas of nutrition, water pollution, energy, reliability, inventory control, game theory, chemical equilibrium, portfolio selection, and parameter estimation. Solution of nonconvex optimization problems. Use of sensitivity theory and of the SUMT method for solving constrained problems. Prerequisite: Math 33. (Fall)
- 261 **Theory of Games (3)** Falk and Staff  
Mathematical models applied to relationships among independent competitive entities, optimum strategies, mini-max concept, connections with linear programming, fair division, two-person and  $n$ -person zero and nonzero sum games. Prerequisite: OR 201 or permission of instructor. (Fall)
- 262 **Decision Analysis (3)** Soland and Staff  
Decision making under certainty, uncertainty, and one and several criteria. Decision analysis and trees, value of information, subjective probability and Bayesian statistics, utility and value theories, multiple-criteria decision making and optimization, goal programming. Prerequisite: ApSc 116 and OR 201 or 251; or permission of instructor. (Fall, even years)
- 271 **Forecasting Techniques (3)** Singpurwalla and Staff  
Regression analysis and other heuristic forecasting techniques. Detailed development of the Box-Jenkins technique for time-series analysis, including moving averages and exponential smoothing as special cases. Application to engineering, business, and economics using special computer software packages. Prerequisite: OR 216. (Fall, odd years)
- 273 **Discrete Systems Simulation (3)** Gross and Staff  
Monte Carlo simulation of discrete stochastic models. Simulation languages. Random-number and random-deviate generation. Statistical design and analysis of simulation experiments. Validation of simulation models. Applications: queuing, inventory, scheduling, and computer models. Prerequisite: ApSc 116, CSci 51, OR 202, or permission of instructor. (Spring)
- 275 **Introduction to Scheduling (3)** Gross and Staff  
Theory of scheduling with emphasis on industrial applications, assembly line balancing, sequencing and scheduling of jobs in machine shops. Mathematical optimization, heuristic programming, and computer simulation approaches to these problems. Prerequisite: OR 202, 251, or permission of instructor. (As arranged)
- 277 **Queuing Theory (3)** Gross and Staff  
Single-channel exponential queuing systems, Markovian single- and multiple-channel models, including birth-death processes, finite sources, bulk and series queues, Erlangian models. General arrival and service patterns. Model building, basic solution techniques, and formal theoretical developments. Prerequisite: ApSc 116, OR 202 or 216, or permission of instructor. (Spring)
- 279 **Inventory Control (3)** Gross and Staff  
Mathematical techniques applied to decisions about when and how much to produce or purchase. Mathematical models of inventory systems with deterministic and stochastic demands, continuous and periodic review policies, multi-item models with constraints, multi-echelon models. Prerequisite: ApSc 116, OR 202 or 216; or permission of instructor. (Fall, odd years)

- 281 Reliability Theory I (3)** Singpurwalla and Staff  
Mathematical theory: coherent structures, association of random variables, stochastic characterization of wear, total positivity, preservation theorems, bounds and inequalities. Statistical theory: probabilistic derivation of failure models, censored, truncated, and sequential life-testing procedures using Bayesian techniques. Prerequisite: OR 216. (Fall)
- 282 Quality Control and Acceptance Sampling (3)** Singpurwalla and Staff  
Mathematical and statistical approaches to quality assurance. Control charts, acceptance sampling by attributes and variables, outgoing quality levels, cost of quality, relationship between reliability and quality, Bayesian techniques, and time-series methods. Prerequisite: ApSc 115 or permission of instructor. (Spring)
- 291 Problems in Operations Research (3)** Fiocco and Staff  
Field experience in operations research on a team basis. Each small group solves an actual problem and formulates a solution using operations research models. Prerequisite: Knowledge of FORTRAN or BASIC. (Fall and spring)
- 297 Special Topics in Operations Research (3)** Staff  
Selected topics in operations research, as arranged. May be repeated for credit. Prerequisite: permission of instructor. (As arranged)
- 298 Research (arr.)** Staff  
Basic or applied research in operations research. May be repeated for credit.
- 299-300 Thesis Research (3-3)** Staff
- 351 Advanced Topics in Mathematical Programming (3)** Falk and Staff  
Fractional and geometric programming, branch-and-bound methods, max-min problems, Lagrangian algorithms, nonconvex optimization techniques. Prerequisite: OR 252 or permission of instructor. (Spring, every third year)
- 352 Nonlinear Programming II (3)** Fiocco and Staff  
Optimality conditions, convex analysis, development of families of unconstrained and constrained algorithms in depth. Discussion of key results in mathematical programming, such as duality, rate of convergence, nonconvex programming, factorable functions, and sensitivity analysis. Prerequisite: OR 252 or permission of instructor. (Fall)
- 353 Sensitivity and Stability Analysis in Optimization (3)** Fiocco and Staff  
Effects of data perturbations on solutions of a nonlinear programming problem. Theoretical results that characterize and validate calculation of sensitivity of optimal values, solution points, and multipliers with respect to changes in parameters. Sensitivity formulas, bounds for optimal values and solution points. Prerequisite: OR 252. (Spring, every third year)
- 354 Optimization Using Factorable Functions (3)** McCormick and Staff  
Nonlinear programming when the problem functions are factorable. Power structure of derivatives, high-order unconstrained algorithms, matrix methods for nonlinear programming, global solution to nonconvex programs, Karmanian projective method and related interior point methods. Prerequisite: OR 252. (Spring, every third year)
- 371 Advanced Topics in Forecasting (3)** Singpurwalla and Staff  
Estimation of parameters of Box-Jenkins models, transfer function models for relating two or more time series, models for intervention analysis and for feedforward and feedback control schemes. Kalman filtering and empirical Bayesian methods. Spectral analysis of time series, including cross-spectral analysis and Fourier analysis. Prerequisite: OR 271. (Spring, even years)
- 373 Design and Analysis of Simulation Experiments (3)** Gross and Staff  
Perturbation and sensitivity analysis. Initial transient problems. Variance reduction techniques. Random number and random variable generation. Response surface methods. Developments in simulation languages. Prerequisite: OR 273 or permission of instructor. (Fall, even years)
- 377 Advanced Stochastic Models in Operations Research (3)** Gross and Staff  
Applied probability models, including the Poisson process, renewal theory, Markov chains, semi-Markov processes, regenerative processes, and continuous-time, denumerable-state Markov processes. Applications to queues, inventories, and other operations research systems. Prerequisite: OR 277 or permission of instructor. (Fall, odd years)



**381 Reliability Theory II (3)**

Singpurwalla and Staff

Mathematical theory: stochastic characterization of multivariate survival, shock models and wear processes, and reliability theory for multistate components. Statistical theory: recent developments in analysis of failure data. Prerequisite: OR 281. (Spring, odd years)

**391 Project for Professional Degree (3)**

Fiacco and Staff

Limited to students in the professional degree program. (Fall and spring)

**397 Advanced Topics in Operations Research (3)**

Staff

Advanced topics from the literature of operations research for analysis, presentation, and discussion. Reading assignments from professional journals selected by the instructor and the student. May be repeated for credit. Prerequisite: permission of instructor. (As arranged)

**398 Advanced Reading and Research (arr.)**

Staff

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Staff

Limited to Doctor of Science candidates. May be repeated for credit.

**PATHOLOGY**

Professors H. Sidransky (Chair), B.C. Zook, I.M. Orenstein, D.S. Wilkinson, C.T. Garrett  
Associate Professors S.G. Kent, S. Silver, G.A. Clawson, A.M. Schwartz

**Master of Science in the field of clinical microbiology (supervisory track)**—A program offered jointly by the Microbiology and Pathology Departments. Prerequisite: a bachelor's degree in medical technology or in biological or physical science and a minimum of three years of experience, within the last five years, in a clinical laboratory.

Required: the general requirements stated under the Graduate School of Arts and Sciences. This is a nonthesis program requiring a total of 36 credit hours, including BIOC 221-22; Micr 225-226, Path 230, 231, 232, Micr or Path 294, and Stat 127. The remaining academic work should consist of graduate-level courses selected with the approval of the Microbiology and Pathology Departments.

**Doctor of Philosophy in the field of pathology**—Prerequisite: one of the following degrees from a recognized professional school: Doctor of Medicine (M.D.), Doctor of Veterinary Medicine (D.V.M.), or Doctor of Dentistry (D.D.S.). In exceptional cases, applicants with other backgrounds in the life sciences may be accepted. Some students may be required to take the Biology (Advanced Specific Field) examination of the Graduate Record Examination.

Required: the general requirements stated under the Graduate School of Arts and Sciences, including 48 credit hours of approved graduate course work. One year of experience in pathology at the University Hospital, equivalent to Path 283, may be counted for a maximum of 24 credit hours of graduate course work. Other experience must satisfy the eligibility requirements of the appropriate national certifying body, i.e., the American Board of Pathology in the case of the M.D., the American College of Veterinary Pathologists in the case of the D.V.M., and the American Board of Oral Pathology in the case of the D.D.S. Research fields: comparative pathology, human pathology, veterinary pathology, biochemical pathology, cardiovascular pathology, and nutritional deficiency pathology.

**203-4 Pathology (4-4)**

Kent and Staff

General introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. Limited enrollment. Prerequisite to Path 203. Anat 202, 203, 204, 205; or equivalent. Prerequisite to Path 204. Path 203. (Academic year)

**230 Pathology and Pathophysiology of Infections (3)**

Silver

An interdepartmental course dealing with the pathophysiology of human response to injury, with emphasis on, but not restricted to, infectious agents. (Fall)

**231 Laboratory Supervisory Clerkship (1)**

Silver

Students rotate through selected clinical microbiology laboratories to observe the techniques of supervision employed in each setting. The type of clerkship a student is required to fulfill is determined individually, based on experience.

- Open only to degree candidates in the clinical microbiology program. (Fall, spring, and summer)
- 232 **Laboratory Management Seminar (1)**  
Management techniques related to the clinical microbiology laboratory environment. Open only to degree candidates in the clinical microbiology program. (Fall and spring)
- 256 **Pathology of Infectious Diseases (3)**  
Correlation of clinical, physiologic, immunologic, and pathologic mechanisms determining the course and morphological changes that occur in infectious diseases. Analysis of cases and review of assigned readings. Prerequisite: Mier 211 and Path 203. (Fall and spring)
- 257 **Transmission Electron Microscopy in Pathologic Diagnosis (3)**  
Techniques for the examination and interpretation of ultrastructural changes associated with human disease states. Emphasis on transmission electron microscopy as a diagnostic tool. Prerequisite: Path 203, 204; Anat 260, 261. (Fall and spring)
- 258 **Organ System Pathology (5)**  
Gross and microscopic study of human pathologic material reflecting major diseases of specific organ systems. The organ systems studied will be related annually, depending on demand. Organ systems to be covered include cardiovascular, digestive, nervous, renal, reproductive, and respiratory. Prerequisite: Path 203, 204, and permission of instructor. (Fall and spring)
- 276 **Seminar in Experimental Pathology (1)**  
Presentations on current topics in experimental pathology. (Fall and spring)
- 283 **Anatomic Pathology Clerkship (arr.)**  
Necropsy and surgical pathology service. Prerequisite: Path 203-4 or equivalent. Five credit hours of credit for each four-week period. Students may receive up to 30 credit hours of credit for six months full time. Open to limited number of graduate students, with permission of instructor.
- 286 **Perinatal Pathology (arr.)**  
Course will focus on the important disorders that may beset the human fetus and the newborn infant. Emphasis on the role of placental abnormalities. Prerequisite: Path 203, 204, and permission of instructor. (Spring)
- 294 **Research in Clinical Microbiology (3)**  
Development and/or evaluation of techniques, procedures, or instrumentation related to clinical microbiology. Limited to students in the master's program in clinical microbiology. Offered jointly by the Microbiology and Pathology Departments. (Fall, spring, and summer)
- 295 **Comparative Pathology (arr.)**  
Participation in veterinary pathology service, including studies of domestic wild, and laboratory animals. Review of training materials and participation in training sessions. Graduate students receive 5 credit hours for each four-week full-time period. Prerequisite: Path 203-4.
- 299-300 **Thesis Research (3-3)**
- 398 **Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PHARMACOLOGY

Professors H.G. Mandel (Chair), V.H. Cohn, P. Mazel, J.A. Straw, P. Klubes, F.P. Abramson, H. Weingartner, S.I. Soldin, T.L. Loo (Research)  
 Professorial Lecturers J. Axelrod, E. Coats, C.C. Lee  
 Associate Professors K.A. Kennedy, D.C. Perry, J. Baumgold (Research), M.R. Pranzatelli  
 Assistant Professors S.R. Patierno, L.L. Werling

Master of Science in the field of pharmacology - Prerequisite: a Bachelor of Arts or Bachelor of Science degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11-12, Phys 1, 2, Math 31, 32, Chem 11-12, 22, 151-52, 153-54. A course in physical chemistry is also recommended.  
 Required: the general requirements stated under the Graduate School of Arts and Sciences, including Bioc 221-22; Phyl 201, 212; Phar 203, 205, 299-300



**Doctor of Philosophy in the field of pharmacology**—Required: the general requirements stated under the Graduate School of Arts and Sciences.

**Research fields:** molecular carcinogenesis, genetic toxicology, cancer chemotherapy, AIDS chemotherapy, neuropharmacology, pharmacology of drug abuse, biochemical and molecular pharmacology and toxicology, drug metabolism, pharmacokinetics, micro-analytic pharmacology.

- 203 Fundamental Principles of Pharmacology and Toxicology (3)** Cohn and Staff  
Basic principles of pharmacology, including drug receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms; mechanisms of mutagenesis, carcinogenesis, teratogenesis, and specific organ toxicity, risk assessment and extrapolation. Admission by permission of the instructor (Fall)
- 205 Pharmacology (8)** Cohn and Staff  
Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis of rational disease therapy. Prerequisite: Phar 203, courses in biochemistry and physiology, or approval of department (Fall)
- 220 Molecular Events in Toxic Actions (2)** Kennedy  
Metabolism of xenobiotics to cytotoxic products. Environmental and genetic factors influencing toxic actions. Molecular mechanisms of toxicity. Prerequisite: Phar 203 (Spring)
- 222 Genetic Toxicology (2)** Staff  
The action of chemicals and radiation in the induction of DNA damage and repair in vitro and in vivo and the sequelae of these processes in cells and mammals. DNA repair mechanisms, mammalian cell toxicity, mutagenesis, and carcinogenesis. Prerequisite: Bioc 221–22. (Spring)
- 230 Special Topics in Toxicology (arr)** Staff  
Selected aspects of toxicology. Content differs each time the course is offered. May be repeated for credit. (Fall and spring)
- 240 Molecular Pharmacology and Toxicology (2)** Patierno  
The impact of molecular biology on pharmacology and toxicology. Molecular mechanisms of drug and chemical action. Gene regulation in metabolism, receptor activity, signal transduction, and cellular stress responses. Gene therapy. Prerequisite: Phar 203, Bioc 221–22, or permission of instructor. (Spring)
- 242 Molecular Carcinogenesis (2)** Patierno  
Molecular biology of cancer initiation and progression. Molecular mechanisms of DNA sequence alteration and repair. Oncogenes, tumor suppressor genes, and metastasis suppressor genes. Prerequisite: Bioc 221–22 or permission of instructor
- 254 Frontiers in Pharmacology (1)** Klubes  
Recent advances and research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)
- 256 Cancer Chemotherapy (1)** Mandel and Staff  
Seminars on mechanisms by which drugs inhibit the growth of tumor cells. (Spring, even years)
- 259 Readings: Cancer and Cancer Chemotherapy (2)** Klubes  
Selected readings and discussion of recent advances in cancer and cancer chemotherapy research. Prerequisite: Phar 201 or 205. (Spring, odd years)
- 269 Pharmacology Seminar (1)** Mandel  
Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall)
- 272 Physiological Disposition of Drugs (3)** Cohn  
Mechanisms for the absorption, distribution, metabolism, and excretion of drugs and the physical, chemical, and biological factors affecting these processes are studied through extensive reading of classical and current original literature. Prerequisite: Bioc 221–22, Phar 203, or permission of the instructor (Spring)
- 273 Pharmacokinetics: Principles and Applications (2)** Abramson and Staff  
A description of compartmental and physiological models of drug disposition. Problem solving to obtain rate constants, organ clearances, etc., from experimental data. Examples of drug disposition exemplifying various pharmacokinetic approaches. (Spring)

- 275-76 Advanced Topics in Pharmacology and Toxicology I-II (1-1)** Cohn and St  
Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (Alternate academic years)
- 277-78 Advanced Topics in Pharmacology and Toxicology III-IV (1-1)** Cohn and St  
Continuation of Phar 275-76. (Alternate academic years)
- 279 Special Topics in Pharmacology (arr.)** St  
Selected aspects of drug action. Content differs each time the course is offered. May be repeated once for credit. (Fall and spring)
- 280 Neuropharmacology (2)** Perry, Worl  
Fundamental principles. Electrophysiological and biochemical techniques. Neurotransmitters and their pathways in the central nervous system. Drug effects on neurotransmitter pathways. Biochemical basis of mental disease. Prerequisite: Phar 205 or equivalent. (Spring)
- 295 Reading and Research (arr.)** St  
May be repeated for credit.
- 299-300 Thesis Research (3-3)** St  
St
- 398 Advanced Reading and Research (arr.)** St  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** St  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PHILOSOPHY

University Professor P.J. Caws

Professors R.H. Schlagel, R.S. French, W.B. Griffith (Chair)

Associate Professors R.P. Churchill, A. Altman

**Master of Arts in the field of public policy with a concentration in philosophy and social policy.** An interdisciplinary program that brings the normative, historical, and analytical skills of philosophical inquiry to bear upon contemporary problems of social policy. Prerequisite: a bachelor's degree from an accredited college or university. Students are expected to have completed the prerequisites to graduate courses.

Required: the general requirements stated under the Graduate School of Arts and Sciences. Two options are available at the discretion of the faculty: (1) a minimum of 36 credit hours of approved graduate course work plus the successful completion of a thesis, or (2) a minimum of 36 credit hours of graduate course work that does not include a thesis. All students are required to take four courses selected from Phil 230, 231, 242, 255, 26, and, for the public policy core, four courses selected from Stat 111, 183, Econ 217, Psyc 244, Stat 129 or CSci 100. Phil 205 is open to all students; it is required of those with insufficient background in philosophy, as determined by the department. Phil 299 is required for students electing to write a thesis. Each candidate must pass a Master's Comprehensive Examination based on the particular interdisciplinary composition of the student's program of study. Prospective candidates should consult Professor W.B. Griffith, chair of the department.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 201-2 Readings and Research (3-3)** St  
Advanced readings and reports. Investigation of special problems. (Academic year)
- 205 Selected Schools and Problems (3)** St  
An advanced review of the rise of modern empiricism, idealism, and pragmatism, with particular attention to controversies regarding problems of method, epistemology, and social and political theory. Recommended for graduate students who have majored in fields other than philosophy. (Offered as the demand warrants)



**230 Ethical Issues in Policy Arguments (3)**

Griffith, Churchill

Critical analysis of ethical foundations of public policy arguments (protection of the environment, health and safety, equality of opportunity). Study of appeals to societal values (preference-satisfaction, welfare improvements), to norms of justice or fairness, and to moral rights. Attention to historical contexts and commitments and to racial, gender, and class biases. (Fall)

**231 Seminar: Economic Justice (3)**

Griffith

Ethical and economic analysis of equity and efficiency of current U.S. income distribution patterns. Theories of justice, economic theories of distribution, assessment of redistribution policies. (Fall, odd years)

**235 Ethics and Business (3)**

Griffith, Lenn

Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, political advertising; development of theory of corporate social responsibility. Same as BA 291. (Spring)

**242 Philosophy, Law, and Social Reform (3)**

Altman

Examination of basic questions about the role law can and should play in society. Topics include the nature and basis of rights, theories of constitutional interpretation; proposals for legal and political reform of Western liberal democracy. (Spring)

**251 Seminar: Philosophy of Science (3)**

Schlagel

Selected topics. (Fall, odd years)

**252 Seminar: Epistemology (3)**

Schlagel

Critical examination of selected problems or theories of knowledge even years) (Fall)

**255 Philosophy of the Social Sciences (3)**

Altman

Philosophic issues relating to theory, methodology, and application of the social sciences. (Fall)

**262 Seminar: Normative Issues in Foreign Policy (3)**

Churchill

Selected issues on the complexities of foreign policy from a normative perspective, including the ethics of military intervention, normative constraints on the pursuit of national interest, the protection of human rights, and the democratic control of foreign policy. (Spring, odd years)

**299-300 Thesis Research (3-3)**

Staff

**PHYSICS**

Professors H.H. Hobbs, O. Bergmann, A.J. Zuchelli, F. Prats, D.R. Lehman (Chair), B.L. Berman, L. Maximon (Research)

Professorial Lecturer A. Ghovanlou

Associate Professors W.C. Parke, N.K. Khatcheressian, M.F. Taragin, E.P. Harper, W.J. Briscoe, J.R. Peverley

Assistant Professors K.S. Dhuga, H. Haberzettl

**Master of Arts in the field of physics**—Prerequisite: a bachelor's degree with a major in physics at this University, or an equivalent degree

1. The master's degree program with thesis—Required: the general requirements stated under the Graduate School of Arts and Sciences, and 30 credit hours of course work in physics including Phys 211, 212, 214, 221-22, 299-300, plus two of the following: Phys 224, 225, 26, 231, 233, 234, 243, 244.

2. The master's degree program without thesis—Required: the general requirements stated under the Graduate School of Arts and Sciences, and 36 credit hours of course work in physics including Phys 211, 212, 214, 221-22, plus two of the following: Phys 224, 225-26, 231, 233, 234, 243, 244

The successful completion of a high-level computer language course with a grade of A or B is required for either option.

**Doctor of Philosophy in the field of physics**—Required: the general requirements stated under the Graduate School of Arts and Sciences, including the following required courses: Phys 299-300, 211, 212, 214, 221-22, 224, 231, 232, 233-34 or 243-44, one course chosen from Math 222, 223, 232

**Research fields:** nuclear physics—experimental and theoretical studies on the structure, electromagnetic and strong interactions, and scattering of few-body systems at low and

intermediate energies; solid-state physics—crystal growth and physical properties of whiskers, and ultrasonic probing of electron scattering in solids.

Consent of a departmental graduate advisor is required for admission to all 200-level courses in physics.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

- 209-10 **Theoretical Methods in Classical and Quantum Physics (3-3)** Habermann  
Joint offering of the Mathematics and Physics Departments. Topics covered include solutions of partial differential equations encountered in physics, techniques of linear algebra, calculus of variations, complex analysis, applications in physics of the theory of analytic functions, integral equations, and group theory in physics.
- 211 **Advanced Mechanics (3)** Torgler  
Analytic methods of mechanics as a basis for modern theory: variational principles, Lagrange's equations, Hamiltonian formulation, canonical transformation, classical perturbation theory.
- 212 **Special Relativity (3)** Bergmann  
Application of relativistic concepts to the basic fields of physics: space and time, tensors and covariant mechanics of point particles, covariant form of electromagnetism, relativistic variational principles, relativistic quantum equations.
- 214 **Electromagnetic Theory** Harker  
Principles of electrostatics and magnetostatics with applications to the solution of boundary-value problems in electrically and magnetically active media. Maxwell's equations, time-varying fields, and plane-wave propagation. Radiation systems and scattering of radiation, including multipole fields. Dynamics of relativistic particles and radiation from moving charges.
- 221-22 **Quantum Mechanics (3-3)** Pines  
General aspects of quantum mechanics with emphasis upon the developments, principles involved. Operators, representations, and transformation theory. Schrodinger and Heisenberg pictures, angular momentum, perturbation theory, scattering theory. (Academic year)
- 224 **Statistical Mechanics (3)** Pines  
Study of classical and quantum-equilibrium statistical mechanics. Kinetic theory and transport phenomena, principles of statistical mechanics. Distribution functions, H theorems, partition functions, Gibbs's paradox, canonical ensemble, grand canonical ensemble, ideal gases, interacting gases, cluster expansion, virial expansion, and density matrices.
- 225-26 **Laboratory (3-3)** Hobbs, Briscoe  
Individual work on special topics. Laboratory fee, \$30 per semester. (Academic year)
- 231 **Quantum Electrodynamics: Theory and Applications (3)** Lehmkuhl  
A presentation of the lower-order effects depending upon the quantal nature of the electromagnetic field: Hamiltonian formulation and field quantization, perturbation calculations, Compton effect, photoelectric effect, electron-electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties.
- 232 **Quantum Field Theory (3)** Parbo  
Covariant presentation of general theory of quantized fields, Boson and Fermion fields, theory of S matrix, dispersion relations, and renormalization program.
- 233-34 **Nuclear Theory (3-3)** Still  
Nuclear interactions, nuclear models, theory of nuclear reactions, pion physics, weak interactions, and electromagnetic interactions.
- 243 **Solid-State Physics: Structure and Binding (3)** Khatcheressian, Hobbs, Pines  
Atomic structure of solids and analysis of the binding of crystals. Crystal forms and symmetries, atomic vibrations and specific heats, sound and optical propagation, crystalline defects.



**244 Solid-State Physics: Electronic**

Khatcheressian, Peverley

Processes in Metals (3)

Phenomena in metals and semiconductors determined by the electronic states allowed: binding, specific heats, magnetic properties, transport phenomena. Independent particle approximation and many-body aspects are discussed.

**250 Selected Topics in Modern Physics (3)**

Staff

Possible topics include nuclear three-body problem; group theory and symmetry principles in physics; differential manifolds applied to physics; electronic states and superconductivity, gauge field theories; dispersion relations and unitarity in scattering theory. May be repeated for credit with permission of graduate advisor. (Fall and spring)

**291 Seminar (1)**

Maximon

Lectures on special problems in physics. May be repeated once for credit. (Fall and spring)

**299-300 Thesis Research (3-3)**

Staff

**398 Advanced Reading and Research (arr.)**

Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated once for credit.

**399 Dissertation Research (arr.)**

Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PHYSIOLOGY

**Departmental prerequisite:** Phyl 201 or equivalent is prerequisite to all listed courses except Phyl 205, 212, and 221

**201 Physiology (8)**

Staff

Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent, Bioc 221 or Phyl 205, or consent of chairman of department. Concurrent registration in Phyl 212 is required. Open to Consortium students only with permission of chairman of department. (Spring)

**205 Regulatory Cell Biology (2)**

Staff

Lecture (2 hours). An introductory survey of the mechanisms for interconversion and utilization of energy in animal cells. A required course for graduate students intending to take Phyl 201. Prerequisite: BiSc 11-12 or equivalent, and consent of instructor. Open to students in the Columbian College of Arts and Sciences with the approval of the student's major advisor. (Fall)

**212 Neurobiology (3)**

Staff

Same as Anat 212. An integrated survey of the structure and function of the human nervous system, lecture, clinical demonstrations, and laboratory. Laboratory fee, \$25. (Spring)

**221 Seminar (1)**

Cassidy

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

**253 Physiology of Fluid Balance and Hydrogen Ion Regulation (2)**

Cassidy

Discussion of principles of fluid and acid-base balance and their applications. (Fall)

**282 Topics in Cardiovascular Physiology (2)**

Staff

Survey, at an advanced level, of aspects of cardiovascular physiology, especially as interrelated with the respiratory and renal systems. (Fall)

**269 Topics in Neurophysiology and Psychophysiology (2)**

Lavine

Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior, and sensory processing. Open to students in the School of Engineering and Applied Science with permission of instructor. (Fall)

**298 Research (arr.)**

Staff

By special arrangement with individual staff members. Approximately four hours per week in the laboratory for each hour of credit. May be repeated for credit.

- 298 Comprehensive Physiology (5)**  
Guided review of selected areas of physiology appropriate to the student's graduate program. Prerequisite or concurrent registration: Phyl 221. (Fall) Staff
- 299-300 Thesis Research (3-3)** Staff
- 396 Advanced Reading and Research (2)**  
Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of physiology and of pertinent areas of the candidate's supporting field. This course satisfies the requirement for Part II of the Cumulative General examination in Physiology. Staff
- 397 Development of Dissertation Problem (2)**  
Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problems. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. Staff
- 399 Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## POLITICAL PSYCHOLOGY

### Committee on Political Psychology

J.M. Post (Director), E. Berkowitz, M. Harmon, J.B. Manheim, P. Poppen, S. Wiley

The Graduate School of Arts and Sciences offers a course sequence in political psychology available to students in the Graduate School, the Elliott School of International Affairs and the School of Business and Public Management.

- 201 Fundamentals of Political Psychology (3)**  
A review of the interdisciplinary field of political psychology: examination of psychological influences on political behavior at the level of the individual, small group, and mass collective; introduction to the psychology of leader-follower relationships. (Fall) Post
- 202 Political Psychology Research Methods (3)**  
Major research methods of political psychology, using classic articles in the field. Both quantitative methods, such as survey research and content analysis, and qualitative methods, such as personality profiling and comparative case studies, are considered. Prerequisite: PPsy 201. (Fall and spring) Shaw
- 203 The Psychology of Political Leadership and Decision Making (3)**  
The psychology of leaders and their followers. Psychobiographic roots of leadership; leader personality types; charismatic leadership; "groupthink" and crisis decision making. Prerequisite: PPsy 201. (Spring) Post
- 204 Public Opinion and Political Socialization (3)**  
Same as PSc 220. Wiley
- 205 Political Violence and Terrorism (3)**  
The origins and the sociopolitical and behavioral dynamics of political violence and terrorism. Major types of terrorism are differentiated. Implications for anti-terrorist policy. The psychology of hostages. Staff

### Other courses that pertain to political psychology

- Mgt 210 *Individual and Group Dynamics in Organizations*  
Mgt 212 *Behavioral Factors in the Process of Change*  
Mgt 215 *Conflict Management*  
Mgt 216 *Cross-Cultural Management*  
PSc 228 *Media and Politics*  
Psyc 209 *Psychology of Motivation*  
Psyc 219 *Group Dynamics*  
Psyc 247 *The Psychology of Leadership in Organizations*  
Psyc 253 *Attitudes and Social Cognition*  
Psyc 254 *Social Influence*  
Psyc 291 *Theories of Organizational Behavior*  
PAd 223 *Management Factors in Complex Organizations*  
PAd 224 *Managerial Leadership in Complex Organizations*  
Soc 210 *Theoretical Foundations of Political Sociology*  
Soc 225 *Theories of Social Changes*



## POLITICAL SCIENCE

Professors B. Nimer, H.C. Hinton, B.M. Sapin, J.A. Morgan, Jr., B. Reich (Chair), Y.C. Kim, J.M. Logsdon, W.H. Lewis, C.A. Linden, H.R. Nau, M.A. East, J.B. Mannheim, C. McClintock, P. Reddaway, J. Post (Research)  
 Associate Professors C.F. Elliott, J.R. Henig, M.J. Sodaro, S.L. Wolchik, R.W. Rycroft, C.J. Deering, C.C. Joyner, H.B. Feigenbaum, J.H. Lebovic  
 Assistant Professors R.P. Stoker, J.P. Rogers, V. Coleman, S.G. Larson, N.J. Brown, S.L. Wiley, S.A. Baynard (Visiting), J. Mitchell

**Master of Arts in the field of political science**—Prerequisite: a bachelor's degree with a major in political science from an accredited college or university, or an equivalent degree, and high undergraduate scholastic standing

**Required:** The general requirements stated under the Graduate School of Arts and Sciences and either (1) a reading knowledge of a modern foreign language or a specified level of knowledge in statistics, or (2) two graduate-level courses in a cognate discipline. Students may elect one of the following programs: (1) 24 credit hours of graduate course work, plus a thesis (equivalent to 8 credit hours), and the satisfactory completion of a Master's Comprehensive Examination in three subfields selected from those listed under the Ph.D. program; or (2) 33 credit hours of graduate course work without a thesis and the satisfactory completion of a Master's Comprehensive Examination in four subfields selected from those listed under the Ph.D. program

All students must take one course chosen from PSc 200, 230, or 240 during the first semester of graduate study. The course selected must have the approval of the coordinator of graduate studies.

**Doctor of Philosophy in the field of political science**—Students of outstanding ability are admitted to the doctoral program upon recommendation of a departmental graduate committee and the concurrence of the dean of the Graduate School of Arts and Sciences.

**Required:** The general requirements stated under the Graduate School of Arts and Sciences. Each student must complete a General Examination, which covers a major and minor field of study

PSc 200 and 201 are required of all students unless they demonstrate knowledge of the courses' subject matter by passing a waiver examination

Each student must choose a major and minor field of study from five principal subject-matter divisions. Each subject-matter division has several subfields of study from which the student, in consultation with an advisor, constructs a program. A major field of study consists of three subfields; a minor field of study consists of two subfields

The subject-matter divisions and their subfields are (1) theory (analysis of Western political thought, analysis of Marxist and Marxist-Leninist thought); (2) comparative and foreign politics (comparative political analysis, comparative communist systems, regional comparative politics, and domestic politics of a specified major political system); (3) international relations (international politics, international law, international organization); (4) American politics (American political process, national policy-making process, American constitutional law and judicial process, and state, local, and urban politics); and (5) public policy (methods of public policy analysis, science policy, domestic policy analysis, and national security policy). Quantitative political analysis may be used as a subfield in any of the subject-matter divisions

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Section for course listings

### 200 Introduction to Political Analysis (3)

Alternative approaches to political analysis, construction of research designs, and problems of measurement. (Fall and spring)

Wiley

### 201 Empirical Political Analysis (3)

Techniques of social science data analysis, with emphasis on statistics and computer applications. PSc 200 or other previous introductory research training is highly desirable. (Spring)

Wiley

### 202 Advanced Topics in Empirical Political Analysis (3)

Advanced techniques of data collection and analysis, varying emphasis on such methods as causal modeling, analysis of variance, regression analysis, and simulation. (Offered as the demand warrants)

Wiley

- 203 **Approaches to Public Policy Analysis** (3)  
Empirical and normative foundations of systematic policy analysis; concepts, theories, models, issues, strengths, limitations, and uses and misuses in the policy process. (Fall) Stoker
- 204 **Methods of Public Policy Analysis** (3)  
Quantitative and qualitative techniques of systematic policy analysis, such as forecasting, cost-benefit analysis, simulation, operations research, social indicators, and quasi-experimental methods. Prerequisite: PSc 203 or equivalent (Spring) Stoker
- 205 **Readings in Political Theory** (3)  
Selected major works, both ancient and modern, that illuminate basic problems and questions of political theory. (Fall) Linden, Mitchell
- 206 **Topics in Political Theory** (3)  
Advanced readings and group discussions. Analysis and interpretation of selected concepts and schools of thought. (Spring) Linden, Mitchell
- 207 **Readings in Socialism and Communism** (3)  
Readings and discussions of works illuminating the development of pre- and post-Marxian socialist thought. (Fall) Elliott, Linden
- 208 **Readings in Marxism-Leninism** (3)  
Readings and discussions in Marxism-Leninism and its controversies from Lenin to the present. (Spring) Elliott, Linden
- 209 **Politics and Public Policy** (3)  
Examination of political processes that influence policy formulation, policy implementation, and the uses of policy analysis. Stoker, Hong
- 210 **American Political Process** (3)  
A survey of American political institutions, processes, and behavior (even years) Deering, Hong
- 211 **State and Urban Politics** (3)  
Comparative analysis of the context, institutions, processes, and policies of state and urban political systems. (Fall) Hong
- 212 **State and Urban Policy Problems** (3)  
Analysis of public policy issues confronting state and urban governments; emphasis on the theoretical roots and empirical impact of past and present programs in such areas as housing, education, poverty, and crime. (Spring) Morgan
- 214 **Topics in Constitutional Law** (3)  
Lectures and group discussions on constitutional law and politics. Morgan
- 215 **Judicial Policy-Making** (3)  
Role of the judiciary in policy formulation; emphasis on the U.S. Supreme Court and civil liberties issues. Starr
- 216 **American Presidency** (3)  
Personalized and institutionalized aspects of the presidency with particular emphasis on the politics of contemporary policy-making. (Spring) Starr
- 217 **Bureaucratic Politics** (3)  
Structure and operation of governmental bureaucracy with particular emphasis on the politics of formulating and implementing public policy. (Spring) Deering
- 218 **Legislative Politics** (3)  
Theory, structure, and process of the U.S. Congress, with emphasis on member-constituency relations, individual and collective decision making, party and committee activities, executive-legislative relations, and interest group activities. (Fall, odd years) Starr
- 219 **American Political Parties and Elections** (3)  
Nature and functions of American political parties; organizational status, nominating and electoral politics, and role in governing. Wiles
- 220 **Public Opinion and Political Socialization** (3)  
Sources and dynamics of public opinion and political socialization. Same as PPay 204. (Spring) Deering and Starr
- 221 **Interest-Group Politics** (3)  
Theory, structure, and activities of interest groups in American politics. Logsdon, Rycroft
- 222 **Science, Technology, and Public Affairs** (3)  
Introduction to the study of science, technology, and public policy; focus on policy issues that arise from interactions between scientific and technological developments and government activity. (Fall)



- 223 **Science, Technology, and Public Policy** (3) Logsdon, Rycroft, Nau  
Research and intensive analysis of selected policy issues with significant scientific or technological aspects. Prerequisite: PS 222; IAF 223 (Spring)
- 224 **Domestic Policy Analysis—Selected Topics** (3) Staff  
Analysis of U.S. policy toward selected domestic problems.
- 225 **Budgetary Policy** (3) Staff  
Analysis of selected topics in U.S. monetary and fiscal policy. Offered off campus only
- 226 **Budgetary Politics** (3) Staff  
Examination of economic policy-making in the United States, with emphasis on major participants and the budget process. Offered off campus only
- 227 **Electoral Laws and Financial Practices** (3) Staff  
State statutes, registration and filing procedures, federal campaign finance legislation, compliance procedures, and enforcement
- 228 **Media and Politics** (3) Larson  
Role of the media in American politics, with emphasis on television news coverage, political debates, political advertising, and their impact on the electorate
- 230 **Comparative Government and Politics I** (3) Kim, McClintock, Feigenbaum  
Examination of basic approaches to comparative politics. (Fall)
- 231 **Comparative Government and Politics II** (3) Kim, McClintock, Feigenbaum  
Comprehensive examination of specific issue areas in comparative political analysis. (Spring)
- 232 **Comparative Communist Systems I** (3) Wolchik  
Comparative analysis of the political history and contemporary political processes of communist states, with emphasis on the Soviet Union and Eastern Europe. Same as Hist 232. (Fall)
- 233 **Comparative Communist Systems II** (3) Wolchik  
Comparative analysis of the political history and contemporary political processes of communist states, with emphasis on China and Cuba, and non-ruling communist parties. Same as Hist 233 (Spring)
- 234 **Comparative Legislative Systems** (3) Staff  
Selected problems of legislative theory and behavior from a comparative perspective, with particular reference to the parliamentary systems of Germany, France, and Britain. Offered off campus only
- 238 **U.S. Foreign Economic Policy** (3) Nau  
Exploration of ideas and issues involved in U.S. foreign economic policy, including relationship of economic and security issues, interdependence, protectionism, role of the dollar, industrial policy, and the debt crisis. (Fall)
- 239 **U.S. Foreign Economic Policy-Making** (3) Nau  
Research seminar focusing on domestic interests and the policy process in U.S. foreign economic policy-making, including business, labor, and public interest groups, the interagency process, and the role of the President. (Spring)
- 240 **Theories of International Politics I** (3) Nimer, Lebovic, East  
Critical examination of contemporary theories, both empirical and normative, with emphasis on actor theory. (Fall)
- 241 **Theories of International Politics II** (3) Nimer, Lebovic, East  
Critical examination of contemporary theories, both empirical and normative, with emphasis on interaction theory. (Spring)
- 242 **Problems in International Organizations I** (3) Staff  
Collective security, law, and the politics of international organizations. (Fall)
- 243 **Problems in International Organizations II** (3) Staff  
Social and economic interdependence and the politics of international organizations. (Spring)
- 244 **International Law I** (3) Joyner  
The sources and development of international law, with special attention given to current trends and future problems. (Fall)
- 245 **International Law II** (3) Joyner  
Critical examination of selected contemporary problems of world order, e.g., legal issues involving global resource regimes, war, economic development, and human rights. (Spring)
- 246 **U.S. Foreign Policy-Making** (3) Sabin, Rogers  
Patterns and problems in contemporary U.S. foreign policy-making. Attention to domestic political factors as well as relevant institutions and agencies. (Fall)

- 247 **U.S. Foreign Policy (3)** Sapin, Rogers  
The substance of contemporary U.S. foreign policy: major problems, concepts, and lines of development since World War II. (Spring)
- 248 **U.S. National Security Policy-Making (3)** Sapin, Lewis, Rogers  
Executive organization and processes for national security policy-making. Attention to relevant theoretical approaches. (Fall)
- 249 **U.S. National Security Policy (3)** Sapin, Lewis, Rogers  
Fundamental considerations; selected issues, e.g., arms control and disarmament, regional security problems, military assistance. (Spring) Star
- 250 **Foreign Policy Analysis—Selected Topics (3)** Star  
Analysis of U.S. foreign policy toward selected world regions
- 257 **Arms Control and Disarmament (3)** Star  
Major issues and trends in the postwar development of U.S. arms control and disarmament policy. (Spring)
- 258 **Communist Party of the Soviet Union (3)** Sodaro  
Analysis of the internal evolution of the Communist Party and its role in the Soviet system from its origins to the present day. Same as Hist 258. (Spring)
- 260 **Western European Politics (3)** Folgerbaum  
Examination of the principal characteristics of the British, French, German, and Italian political systems, comparing their institutional and behavioral adaptations to the problems of advanced industrial democracies. (Fall) Star
- 261 **Politics of the European Community (3)** Star  
Problems in Western European politics, with emphasis on supranational political processes and selected policy outcomes in the context of the European Common Market. (Spring)
- 262 **The Political Economy of Western Europe (3)** Folgerbaum  
An examination of the relationships between economic interests and politics as they affect the societies of Western Europe. Selected issues of public policy are discussed. (Spring) Star
- 263 **The Soviet Union and Europe (3)** Sodaro  
Soviet foreign policy toward Western and Eastern Europe, including its economic and military dimensions. (Fall) Wolchuk
- 264 **Governments and Politics of Eastern Europe (3)** Wolchuk  
Comparative analysis of domestic political processes and policies in Eastern Europe. (Fall)
- 265 **The International Politics of Eastern Europe (3)** Wolchuk  
Major historical, political, social, and regional factors that have shaped the interwar, World War II, and postwar evolution of Eastern Europe, emphasis on foreign relations with outside powers and on regional East-West contacts. (Spring)
- 266 **Readings in Soviet Government and Politics (3)** Elliott, Linden  
Readings in contemporary Soviet domestic government and politics. (Fall)
- 267 **Soviet Government and Politics (3)** Elliott, Linden, Roddaway  
Research seminar in selected problems of Soviet domestic government and politics. Emphasis, since Stalin. Prerequisite, PSc 266 or permission of instructor. (Spring)
- 268 **Soviet Foreign Policy (3)** Elliott  
External problems and policies of the U.S.S.R., with emphasis on the period since Khrushchev. Relations with communist states, Western powers, Third World countries, and nonruling communist parties. (Spring)
- 269 **Soviet Military Policy and Strategy (3)** Elliott  
Developments in Soviet military policy and strategy. Emphasis on party-military relations, the decision-making process, manpower problems, structure of the Soviet armed forces, and the external role of the Soviet military. (Fall)
- 270 **Politics of the People's Republic of China I (3)** Hinton  
Introduction to the substance of and literature on contemporary Chinese politics. Discussion and reading. (Fall)
- 271 **Politics of the People's Republic of China II (3)** Hinton  
Research seminar. Introduction to the analysis of official Chinese documents and other primary materials. Presentation of student papers. Prerequisite, PSc 270 or equivalent. (Spring, even years)



- 272 **Foreign Policy of the People's Republic of China** (3) Hinton  
Objectives; formulation and implementation; the People's Republic of China as  
Asian state, revolutionary influence, would-be great power (Spring)
- 274 **Governments and Politics of Japan and Korea** (3) Kim  
Readings and research on the domestic and foreign policies of Japan and North  
and South Korea. (Fall or spring)
- 275 **International Politics of East Asia** (3) Hinton  
Foreign policies and international behavior of the regional states (especially  
China, Japan, and Vietnam) and the extraregional powers (especially the U.S. and  
the U.S.S.R.). (Spring, odd years)
- 276 **The Arab-Israeli Conflict** (3) Reich  
Readings and research on the origins, evolution, and issues of the Arab-Israeli  
conflict. (Spring)
- 277 **Governments and Politics of the Middle East** (3) Reich, Brown  
Readings and research on selected problems of the governments and politics of  
the Middle East. (Fall)
- 278 **International Relations of the Middle East** (3) Reich, Brown  
Readings and research on the regional and international relations of the Middle  
East. (Spring)
- 279 **The Powers in the Middle East** (3) Reich  
The role of the powers in the Middle East, with emphasis on the policies of the  
United States and the Soviet Union. Consideration is given to other major Euro-  
pean and Asian powers. (Fall)
- 280 **Governments and Politics of North Africa** (3) Reich, Lewis  
Readings and research on selected problems in the governments, politics, and  
international relations of North Africa. (Fall)
- 281 **Topics in African Politics** (3) Staff  
Readings, research, and discussion of selected aspects of African domestic and  
international politics. (Fall)
- 283 **Governments and Politics of Latin America** (3) McClintock  
Readings and discussion on the politics of selected countries in South America,  
Central America, and the Caribbean. Emphasis on the possibilities for democracy  
and revolution. (Fall)
- 284 **International Relations of Latin America** (3) McClintock  
Readings and discussion on U.S.-Latin American relations and the foreign  
policies of selected states. (Spring)
- 288 **Selected Topics in American Politics** (3) Staff  
Readings and discussion. (Fall or spring)
- 287 **Selected Topics in Political Theory** (3) Staff  
Readings and discussion. (Fall or spring)
- 288 **Selected Topics in Comparative Politics** (3) Staff  
Readings and discussion. (Fall or spring)
- 289 **Selected Topics in International Politics** (3) Staff  
Readings and discussion. (Fall or spring)
- 297 **Reading** (3) Staff  
Limited to master's degree candidates. Written permission of instructor required.
- 298 **Research** (3) Staff  
Limited to master's degree candidates. Written permission of instructor required.
- 299-300 **Thesis Research** (3-3) Staff  
301 **Advanced Reading and Research in Political Theory** (3) Staff  
310 **Advanced Reading and Research in American Politics** (3) Staff  
340 **Advanced Reading and Research in Comparative Politics** (3) Staff  
350 **Advanced Reading and Research in International Politics** (3) Staff  
397 **Advanced Reading** (3) Staff  
Limited to students preparing for the Doctor of Philosophy general examination  
May be repeated for credit.
- 398 **Advanced Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination  
May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PSYCHOLOGY

Professors J. N. Mosel (Emeritus) R. D. Walk, A. D. Kirsch, V. Kirkbride (Emeritus), C. E. N. E. Abravanel, D. E. Silber, J. Miller, L. A. Rothblat, R. A. Peterson, J. Zeidner (Research)  
**H. Weingartner, R. D. Caplan, P. Wirtz, J. Post (Research)**  
 Professorial Lecturers R. K. Kahn, M. Sashkin, J. C. Sharf, R. W. Swezey  
 Associate Professors S. A. Karp, R. W. Holmstrom, P. J. Poppen (Chair), L. Brandt Hashtroudi, L. R. Offermann  
 Assistant Professors C. A. Rohrbeck, F. Z. Belgrave, M. L. Jasnoski, M. C. Zea, C. E. Sorensen  
 Assistant Professorial Lecturer C. Reisen

### Clinical Training Staff

Clinical Professors J. Borriello, D. E. Holmes  
 Associate Clinical Professors E. Blum, D. A. Jensen, M. E. Zedek, E. J. Jordan, D. M. DeMatteo, R. L. Jenkins  
 Assistant Clinical Professors M. Harris, P. L. Ellman, M. D. Jasnow, K. R. Miller, J. Moldauer, C. E. Parks, W. L. Scarpetti, N. Z. Bien, B. J. Brown, D. E. Cooper, M. DiSabatino, R. C. Fritsch, R. C. Gresen, Q. Graham, Z. Gyorky, C. Verghese

**Master of Arts in the field of psychology—Prerequisite: the degree of Bachelor of Arts with a major in psychology or an equivalent degree.** Admission to the program is limited; preference will be given those who plan to continue toward a Doctor of Philosophy degree.

**Required: the general requirements stated under the Graduate School of Arts and Sciences.** Of the 24 required credit hours (exclusive of the thesis), a minimum of 18 must be in third-group psychology courses, including Psyc 201 or 202 and 203 or 204. 6 credit hours may be in related fields approved by the department. For detailed requirements consult the chair of the doctoral program committee.

**Doctor of Philosophy in the field of psychology—Prerequisite: the degree of Bachelor of Arts with a major in psychology.** Students admitted from other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in psychology.

**Required: the general requirements stated under the Graduate School of Arts and Sciences, including (1) Psyc 201–2, 203–4, and appropriate statistics courses and (2) satisfactory completion of a first-year examination and the General Examination in psychology.** For detailed requirements, consult the chair of the department or the chair of the doctoral program committee.

**Areas of study: clinical, developmental, cognitive neuropsychology, industrial, organizational, and applied social psychology.**

Courses at the 200 level are limited to graduate students in psychology, except by permission of instructor.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

### 201–2 Psychological Research Methods and Procedures (3–3)

Required in all graduate psychology programs. Includes philosophy of science, types of research design, and methods of data collection. Prerequisite: adequate standing, a laboratory course in psychology, and an elementary course in statistics. (Academic year)

### 203–4 Experimental Foundations of Psychology (3–3)

Required of doctoral students in psychology during first year of study. Psyc 203: Basic issues in learning and memory. Psyc 204: Physiological processes, sensation and perception. (Academic year)

### 207–8 Psychological Assessment (3–3)

Open only to clinical graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychological tests, and projective techniques. Two-hour laboratory—diagnostic work in clinical facilities. Material fee, \$40 per semester. (Academic year)

### 209 Seminar: Psychology of Motivation (3)

Various theoretical approaches to the psychology of motivation; systematic concepts and experimental findings deriving from each approach. (Spring)



- 211 **Assessment of Cognitive Functioning (3)** Staff  
Concepts of intelligence and achievement and their assessment through a variety of individual procedures. Material fee, \$30. Admission by permission of instructor. (Summer)
- 212 **Personality Assessment by Projective Techniques (3)** Staff  
Personality assessment: Rorschach, TAT, and other apperception methods. Material fee, \$25. Admission by permission of instructor. (Summer)
- 213-14 **Seminar: Developmental Psychology (3-3)** Abravanel, Brandt  
Psyc 213: research and theory in developmental psychology, with emphasis on cognitive, perceptual, and language functioning development. Psyc 214: current research and theoretical issues in cognitive and social development in infancy and the social bases of communication and language. (Academic year)
- 215 **Psychodynamic Approaches to Child Assessment and Therapy (3)** Miller  
A broad range of issues in child personality development will be considered, with special focus on drives, interpersonal relations, defenses, intellectual capacities, and moral development. Admission by permission of instructor. Material fee, \$25. (Fall)
- 216 **Psychological Assessment by Graphic Means (3)** Staff  
Examination of graphic procedures for assessment of intelligence and personality; clinical use and evidence of validity. Common interpretive principles sought. Human figure drawings and free paintings as examples. Admission by permission of instructor. (Fall)
- 218 **Seminar: Systems of Psychotherapy (3)** Jasnoski, Silber  
Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego centered, nondirective, transactional, and others. Original sources surveyed. (Fall and summer)
- 219 **Group Dynamics (3)** Miller  
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportunity is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited.
- 220 **Seminar: Abnormal Psychology (3)** Miller  
Study of selected problems of psychopathology. (Fall)
- 221-22 **Seminar: Group Psychotherapy (3-3)** Borriello  
For graduate students in the clinical psychology program. Open to others if space permits and with permission of instructor. Psyc 221: Survey of group therapy approaches; Psyc 222: Supervised experience with therapeutic groups. Prerequisite: Psyc 221; Psyc 219. (Alternate academic years)
- 223 **Seminar: Human Memory (3)** Hashtroudi  
Selected topics of current research interest in the area of human memory. Emphasis on encoding and retrieval processes, amnesia, and disorders of memory. (Spring)
- 225 **Behavioral Approaches to Child Assessment and Therapy (3)** Rohrbeck  
Child assessment and treatment from a behavioral viewpoint. The application of conditioning, reinforcement, and shaping principles with reference to specific disorders of childhood.
- 226 **Seminar: Clinical Psychology of Childhood and Adolescence (3)** Brandt  
For graduate students in psychology, open to others with permission of instructor. Exploration of major topics concerning psychopathology in children and adolescents; discussion of nosological issues with emphasis on theoretical and research literature.
- 227-28 **Seminar: Principles of Psychotherapy (3-3)** Kahn  
For graduate students in clinical psychology; open to others with permission of instructor, if space permits. Patient's needs and demands on the therapist. Case participation heavily relied upon. Prerequisite: Psyc 218. (Academic year)
- 229 **Seminar: Principles of Behavior Change (3)** Peterson  
Behavioral learning methods and theory applied to clinical problems. (Fall)
- 230 **Methods in Applied Behavior Analysis (3)** Staff  
Methodology used in clinical behavioral research and other areas, using a small number of subjects. Research designs and data collection techniques are emphasized. (Fall)

- 231 **Development of Psychometric Instruments** (3)  
Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practical application. Quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics. (Fall)
- 232 **Ego Psychology and Theories of Object Relations** (3)  
Emphasis on theoretical contributions of Freud, Hartmann, Klein, Kohut, and others. Assessment and treatment are addressed, primarily with reference to investigations of borderline and characterological disorders. (Spring)
- 234 **Seminar: Theory of Psychological Measurement** (3)  
Examination of classical test theory (which underlies most current test construction and interpretation) and the newly emerging area of item-response theory. Recent developments in validity generalization. (Spring—alternate years)
- 235 **Seminar: Community Psychology** (3)  
For graduate students in the Department of Psychology; open to others, with permission of instructor, only if space permits. Survey of issues and techniques in community psychology; emphasis on educational systems and community psychology issues.
- 236 **Seminar: Minorities and Mental Health** (3)  
Factors affecting the mental health of minorities. Treatment considerations and differences in theoretical approaches with respect to minorities. (Spring)
- 237-38 **The Practice of General Psychology** (3-3)  
Application of psychological principles and findings to a wide spectrum of human problems. Professional issues facing the psychologist offering services. Participation in the development, implementation, and evaluation of applied psychological services and projects. (Academic year)
- 240 **Seminar: Selected Topics in Psychopathology** (3)  
Examination of current research and theory in psychopathology. (Spring)
- 241-42 **Family Systems: Theory, Practice, and Research** (3-3)  
Family dynamics and their implications for assessment and treatment. Special emphasis on the role of research in the process of evaluation of family systems and family therapy. Enrollment limited to advanced doctoral students in community psychology. (Academic year)
- 243 **Psychoanalytic Theory and Research** (3)  
An introduction to classical and modern psychoanalytic theory and research. A review of Freud's central works, focusing on his case studies and their role in theory development. Emphasis on instinct theory, with comparisons to contemporary studies of dreams, infant observation, male and female personality development, psychopathology, and related topics.
- 244 **Theories and Processes of Organizational Management** (3)  
Basic functions and techniques of organizational management—design, control, direction, and decision making—examined from the viewpoint of behavioral science.
- 245 **Seminar: Organizational Behavior** (3)  
Analysis of organizational behavior, emphasis on motivation and productivity. Recent research on employee attitudes, primary group, supervisory leadership, formal and informal organization, job design. (Fall)
- 246 **Seminar: Personnel Evaluation Techniques** (3)  
Techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, performance ratings, and assessment centers. Consideration of federal guidelines in employee selection. Includes practicum.
- 247 **Seminar: Psychology of Leadership in Organizations** (3)  
Theories and issues related to the emergence and effectiveness of leaders, with focus on leadership behaviors and processes in organizations.
- 248 **Organizational Behavior Research Applied to Organizational Intervention and Change** (3)  
Emphasis on development of models of organizational effectiveness; design of valid diagnostic instruments; implementation of research strategies; establishment of program-evaluation criteria. (Fall)



- 249 **Organizational Behavior Modification** (3) Staff  
Application of operant reinforcement, behavioral systems analysis, and other experimentally derived procedures, such as goal setting and feedback, to improving individual and group work performance. New approaches to intrinsic job motivation based on covert reinforcement principles. (Spring--alternate years)
- 250 **Human Resources Management** (3) Staff  
An examination within a psychological systems perspective of the requirements for integrating employee assessment, placement, training, and motivation modules into a unified human resources development program. Emphasis on models and techniques of organizational development and the utilization of key organizational factors to determine content of the program.
- 253 **Attitudes and Social Cognition** (3) Belgrave  
Social psychology theories, conceptual approaches, and their applications. Attitude formation and change, social cognition, person perception, attribution, information processing, attraction, stereotyping.
- 254 **Social Influence** (3) Offermann  
Social psychology theories, conceptual approaches, and their applications. Analysis of intentional and unintentional social influence processes and their effects on behavior. Current research on conformity, social power, social exchange, and impression management.
- 255 **Applied Research Methods: Research Design** (3) Poppen  
Analysis of problems in research design in basic and applied social psychological research. Focus on conceptualization, operationalization of variables, and experimental and quasi-experimental design. (Fall)
- 256 **Applied Research Methods: Data Collection and Analysis** (3) Poppen  
Methods of data collection and analysis, especially in field settings and surveys with nonexperimental designs. Topics include methods of obtaining information (questionnaires, interviews, records), creation of indicators, exploratory analysis of large-scale data bases; analysis and interpretation of data when research units have not been randomly assigned to treatments. (Spring)
- 257 **Current Topics in Social Psychology** (3) Poppen, Offermann, Belgrave  
Advanced seminar with focus on major theoretical approaches, research, or problem areas within field of social psychology. Topic changes each semester. (Fall and spring)
- 260 **Psychology of Work Group Development** (3) Offermann  
Examination of theory and research on groups as task performance systems. Approaches to team development as a means of improving work group effectiveness, including goal setting, role clarification, increasing interpersonal skills, and conflict resolution. (Spring)
- 263 **Evaluation Research** (3) Rice  
Research issues and methods in evaluating the impact of organizational and social intervention and service programs. Specification of program goals and effectiveness criteria, measurement problems, experimental and quasi-experimental designs, political problems surrounding evaluation research. (Spring, even years)
- 268 **Seminar: Neuropsychology** (3) Rothblat  
Selected problems in research relating the brain and behavior. Independent topics each semester, such as sensory processing, brain development and behavior, clinical aspects of nervous system function.
- 272 **Seminar: Theories of Personality** (3) Staff  
Emphasis on theoretical problems and methodology in the field of personality study. (Fall, odd years)
- 277 **Health Psychology** (3) Belgrave, Poppen  
Social and psychological theories and research that relate to health and illness. Application of theories of social learning, attribution, attitude change, and social influence to topics such as health promotion and disease prevention, health compliance, and coping with illness and disability.
- 278 **Behavioral Medicine** (3) Jasnoski, Peterson  
The psychological causes, outcomes, and treatments for a wide variety of medical illnesses. Examination of research on the effectiveness of programs designed to promote health, to encourage compliance, and to foster lifestyle changes.

- 279 Special Topics in Health Psychology (3)**  
A comprehensive review of a special topic area within health psychology. Topics change each semester. May be repeated for credit. Admission by permission of the instructor.
- 281 Clinical Neuropsychology I (3)**  
Analysis of experimental and clinical findings from studies attempting to localize and interpret human brain dysfunction, with emphasis on perceptual and cognitive behavior. Topics include overviews of neuroanatomy and neurological techniques, theoretical consideration of major neuropsychological disorders. Admission by permission of the instructor.
- 282 Clinical Neuropsychology II (3)**  
Examination of important psychological procedures for the assessment of human brain dysfunction. Instruments and batteries such as the Bender-Goswami Wechsler Adult Intelligence Scale, Halstead-Reitan Neuropsychological Battery, and Luria's Neuropsychological Tests. Prerequisite: Psyc 211, 212, 281 and permission of the instructor.
- 289 Seminar: Current Topics in Experimental Psychology (3)**  
Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester. May be repeated for credit. (Fall and spring)
- 290 Seminar: Macro-organizational Behavior (3)**  
Examination of variables characterizing the total organization as the unit of analysis, the relationship of such variables to the behavior of the individual. Complexity, power, and conflict will be considered, along with contextual dimensions such as organizational environment. (Fall, odd years)
- 291 Theories of Organizational Behavior (3)**  
Examination of current theoretical models and research. (Spring)
- 292 Seminar: Perception (3)**  
Study of current research and theory in the experimental psychology of perception and perceptual development. (Spring)
- 295 Independent Research in Psychology (3)**  
Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated for credit.
- 299-300 Thesis Research (3-3)**
- 398 Advanced Reading and Research (arr.)**  
Limited to students preparing for the Doctor of Philosophy major field examination. May be repeated for credit.
- 399 Dissertation Research (arr.)**  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PUBLIC ADMINISTRATION

**Professors** S.R. Chitwood, M.M. Harmon, S.J. Tolchin, W.C. Adams, B.L. Catron, S. Trachtenberg, K.E. Newcomer (Chair)  
**Associate Professors** J.F. Kasse, J.E. Kee, C.J. McSwain, H.L. Ernstthal

See the School of Business and Public Management for programs of study leading to the degrees of Master of Public Administration and Doctor of Philosophy.

- 205 Introduction to Public Administration and Management (3)**  
Provides frame of reference for study of public administration. Historical development, contemporary approaches, roles of the public manager, ethics, and norms, administrative responsibility and public interest. Management in the public sector. (Fall and spring)
- 208 Ethics and Public Values (3)**  
Ethical dimensions of personal and professional judgments of public officials. Cases are used to consider the ethos of public organizations and the moral foundations of public policy. (Fall)
- 212 Legislative Management: Congress and Its Functions (3)**  
Analysis of Congress as a management system, examination of its internal administration and its role in formulating policy through legislation. Executive



- tive relationships, staffing practices, budget processes, leadership, rules and procedures, oversight functions, and the management of foreign policy are examined. (Fall)
- 213 **Administration in the Federal Government** (3) Tolchin  
Critical analysis of the structure and administration of the federal government from both a managerial and political perspective. Emphasis on executive branch organization, integration, and coordination, as well as current trends in government regulation, accountability, and effectiveness. (Fall)
- 215 **Law and the Public Administrator** (3) Chitwood, Kasle  
Exploration and analysis of the functions of law in a democratic society. Emphasis is placed upon the procedural, historical, and jurisprudential dimensions of American law. This broad perspective seeks to convey understanding of the law as a legal and moral force guiding and constraining public decision making. (Spring)
- 216 **Federal Government Regulation of Society** (3) Tolchin  
Analysis of the federal regulatory process as it affects the public and private sectors. Specific problems involving presidential management, policy conflicts, reform efforts, legislative oversight, and economic deregulation are emphasized. Same as SMPP 203. (Spring)
- 217 **Seminar: Development Administration I** (3) Honadle  
The nature of program development and implementation. Specific organization and management problems of less developed countries. National, cultural, and political context. The giving of assistance: types of technical aid; problems of working with aid givers; analytical methods. (Fall)
- 218 **Seminar: Development Administration II** (3) Honadle  
The transfer of administrative capability from one country to another. Political and administrative development theories. The role of innovation. Strategies of institutional development. Organization of natural resource management. (Spring)
- 221 **Organization Theory and the Public Sector** (3) Harmon  
Analysis of organization theory with special focus on public organizations; current issues in organization theory; decision making; the organizational environment and the changing nature of organizations in a postindustrial society. (Fall and spring)
- 223 **Management Factors in Complex Organizations** (3) McSwain  
Analysis of the nature and characteristics of management and behavior in public organizations. Approaches to management and leadership in public organizations; influence and control systems; future trends. (Fall and spring)
- 224 **Managerial Leadership in Complex Organizations** (3) Chitwood, Kee  
What the manager must know and do to provide leadership and guidance in large, complex organizations. An exploration of factors and processes that condition effective executive and managerial leadership. (Spring)
- 231 **Human Resources Management** (3) Staff  
Same as Mgt 204.
- 232 **The Human Resources Manager** (3) McSwain  
Same as Mgt 206.
- 233 **Seminar: Manpower Planning, Development, and Utilization** (3) West  
Examination of public and private manpower trends, problems, policies, and programs. Exploration of approaches to the analysis and administration of manpower programs. Analysis of impact of economic, political, and social factors on manpower. (Fall)
- 235 **Seminar: Technology Change and Professional Human Resource Planning** (3) Frame  
Addresses human resource problems arising from automation and other technological changes. Evaluation of these developments in government, business, and educational organizations, and their implications for productivity, employment, training, and education. Analysis of economic, political, and social factors influencing public and private human resource policies. (Spring)
- 236 **Unionism and Collective Bargaining** (3) Burdetsky  
Same as Mgt 208. (Fall)
- 242 **Administration of State and Local Governments** (3) Staff  
Examination of state and local governmental structures and functions, their place within the federal system, their revenue sources, their limitations, and the

alternatives available to encourage more effective administration to meet public and private demands. (Fall)

**245 Intergovernmental Relations (3)**

Assessment of the impacts and consequences of changes in the administration of intergovernmental policies and programs in the federal system. Legislative roles, and responsibilities of federal, state, regional, and local systems are examined from both theoretical and practical vantage points.

**246 Dynamics of Citizen Participation in Administration (3)**

Review of the basic theory and principles of democracy in the American system of governance. Analysis of the nature of participation in a pluralistic society including the characteristics and dynamics of citizen-based organizations. Exploration of effective methods or models by which citizens may contribute to administration. (Fall)

**248 Financing State and Local Government (3)**

Analysis of the theory and practice of public finance in state and local governments. Includes the financing of services through municipal taxation, intergovernmental funds, debt instruments, and other revenue sources. Review of expenditures as well as financial management practices. Same as UPRE 257 (Fall)

**249 Urban Public Policy (3)**

Examination of selected national policies and their effects on urban areas and governments. Emphasis on policy dimensions of urban systems and their relationship to the social, political, and economic context. Against the background of urban politics and administration, areas of health, education, welfare, mass power, transportation, and housing will be addressed. (Spring)

**251 Governmental Budgeting (3)**

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting, their role in the management process. (Fall)

**252 Public Expenditure Analysis and Planning (3)**

Intensive analysis of the concepts and principles of economics as applied to the public sector and the analytic techniques used by government agencies in planning, allocating, and managing scarce resources in the implementation of public programs. Topics include benefit-cost analysis, program budgeting, and tax and expenditure analysis. (Fall and spring)

**253 Financial Management in the Public Sector (3)**

Intensive analysis of the concepts, principles, and general practices of financial management within federal departments and agencies, focusing on the interrelationships of financial and program functions and drawing on the several financial disciplines of budgeting, accounting, and auditing. (Spring)

**260 Policy Formulation and Administration (3)**

Impact of economic and political factors on public policy formulation and implementation; intensive analysis of the analytical, normative, and decision-making models of the policy process with special emphasis on their relationship to current policy problems. (Fall and spring)

**261 Policy Analysis in Public Administration (3)**

Current issues in public policy analysis. Conceptual problems encountered in policy analysis. The role and limits of analytic techniques in the development, implementation, and evaluation of public policy. (Fall and spring)

**264 Public Program Evaluation (3)**

Theory and practice of program evaluation and evaluative research. Exploration of scope and limitations of current practice in evaluation, considering economic, political, social, and administrative factors. Examination of methodological considerations for design, data collection, analysis, and dissemination. (Fall and spring)

**267 Cases in Public Policy (3)**

Critical analysis of topical issues in public policy, using a case-study approach. Specific issues covered will vary. Designed principally for M.P.A. students in the last half of their program. (Summer)

**270 Telecommunication Administration (3)**

Human factors in telecommunication innovations within a public organization. Federal role in research, development, and regulation of telecommunication. Acquisitions process for major systems in federal agencies. International telecommunication policies and controversies. (Fall and spring)



- 271 Telecommunications Management (3)** Kasle  
 Emphasis on planning in regulated industries, managing in a technology-based industry, and personnel development. Varieties of management styles and their strengths and weaknesses, legal constraints, responsibilities and ethics. (Fall and spring)
- 272 Telecommunications Finance (3)** Staff  
 Theories and approaches to telecommunications economics and finance. Examination of cost and price setting, cost allocation, price de-averaging in response to competition, tariffs, accounting and jurisdictional separations, predatory pricing, and aggregate valuation and operating measures. (Spring)
- 274 Regulation of Communications Common Carriers (3)** Kasle  
 The history, development, law, and public policy issues of communications common carriers; emphasis on telephone and satellite industries, the impact of antitrust law, the effects of divestiture, the reconfiguration of the telephone industry; future trends. (Fall and spring)
- 275 Telecommunications Choices for Public Managers (3)** Kasle  
 Critical management and policy issues facing the public manager in telecommunications. Location of managerial responsibility, planning methods and needs surveys, centralized vs. decentralized management and control, in-house facilities vs. cost/time sharing, controlling costs, productivity implications, and networking. (Spring)
- 280 Purchasing and Materials Management (3)** Sherman  
 Same as MLOM 280
- 281 Procurement and Contracting (3)** Sherman  
 Same as MLOM 281
- 282 Government Contract Administration (3)** Sherman  
 Same as MLOM 282
- 283 Pricing and Negotiation (3)** Sherman  
 Same as MLOM 283
- 285 Systems Procurement and Project Management (3)** Sherman  
 Same as MLOM 285.
- 288 Field Problem Studies (3)** Staff  
 Field research and approved Internships on selected issues and aspects of public administration, including specific policy and management problems arising in governmental agencies and related public institutions. Open to master's students upon completion of 9 hours toward the degree program and with the consent of the intern coordinator. (Fall and spring)
- 289 Public Program Management and Policy Implementation (3)** McSwain  
 Review of the diverse concepts and issues in public administration; analysis and integration of political, economic, managerial, and leadership values and issues that are likely to be raised in implementing public policies in the future. Open only to M.P.A. degree candidates in their final semester of study; serves as a capstone seminar to the M.P.A. program. (Fall and spring)
- 290 Special Topics (3)** Staff  
 Experimental course; new course topics and teaching methods. May be repeated once for credit.
- 295 Research Methods (3)** Adams, Newcomer  
 Theory and practice in research methodology. Data sources and gathering, research models and designs. Critical evaluation of research studies. Emphasis on application of research methods to policy questions. (Fall and spring)
- 296 Statistical Applications in Public Administration (3)** Adams, Newcomer  
 Use of statistics, computers, and SPSS in research and program evaluations. Emphasis on interpretation and use of statistics. Development of basic statistical competency; frequency distribution, sampling, central tendency, variability, correlation, probability, regression. (Fall and spring)
- 298 Directed Readings and Research (3)** Staff  
 Supervised reading in selected fields within public administration. Admission by permission of instructor. May be repeated once for credit.
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
 Same as SMPP 311

- 323 **Seminar: The Complex Organization** (3)  
Unique problems of complex organizations: public, private, and mixed. Emerging concepts and theories. Selected issues. McSwain
- 373 **Seminar: Public Administration and American Political and Social Institutions** (3)  
Supervised in-depth study of contemporary and historical literature in selected fields in public administration. (Spring) McSwain
- 374 **Seminar: Trends in Public Administration Theory** (3)  
Survey of contemporary normative and epistemological issues in public administration theory and practice. Analysis of the past and present influence of social positivism, behaviorism, humanism, existentialism, and phenomenology. (Fall) Harmon
- 377 **Seminar: Social Action and Public Policy** (3)  
Interdisciplinary approach to the normative foundations of public policy based on theoretical problems of social action; interrelation of theory and practice. (Spring) Catron
- 393 **Substance and Method: Current Topics and Research** (1)  
Current research discussed in a colloquium setting. The conduct of research and presentation of research findings. May be repeated for credit. Stall
- 398 **Advanced Reading and Research** (arr.)  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit. Stall
- 399 **Dissertation Research** (arr.)  
Limited to doctoral candidates. May be repeated for credit. Stall

## PUBLIC POLICY

### Doctoral Committee on Public Policy

C.E. Rice (Acting Chair), M.D. Bradley, W.B. Griffith, J.R. Henig, R.K. Reigelman, Singpurwalla, H. Solomon, C.T. Stewart, R. Stoker, P. Wirtz

The Graduate School of Arts and Sciences offers interdisciplinary programs leading to the degrees of Master of Arts and Doctor of Philosophy in the field of public policy. The master's program allows students to concentrate in one of three policy areas: environmental and resource policy, philosophy and social policy, or women's studies. Students not desiring such a specialization or wishing to prepare for doctoral work in public policy may undertake a more general program. The doctoral program, intended for those wishing to pursue academic or policy-making careers, is concerned with policy research and analysis. Students may select an applied field of study in education policy, employment policy, health policy, natural resources and environmental policy, national security policy, and science and technology policy.

**Master of Arts in the field of public policy**—Required: the general requirements stated under the Graduate School of Arts and Sciences. For the general program, the requirements include a core curriculum consisting of PPol 211–12, 290, Econ 221, Psc 203, 206, Phil 230; plus five elective courses chosen with the approval of the advisor. For special concentration requirements, see Environmental and Resource Policy, Philosophy and Women's Studies.

**Doctor of Philosophy in the field of public policy**—Required: the general requirements stated under the Graduate School of Arts and Sciences, including (1) a pre-qualifying examination consisting of PPol 211–12; Econ 221–22; PAd 221; PSc 203; and one course chosen from PSc 216, 217, or 218; (2) a written qualifying examination; (3) a post-qualifying core consisting of Phil 255, Soc 776, and Mgt 301; (4) a minimum of 36 hours related to one of the six policy fields; (5) completion of research skills requirements in one of the following: statistics, computer programming, and historical research methods; and (6) completion of the general examination in the form of an approved dissertation proposal. Stall

### 211–12 Research Methods in Policy Analysis (3–3)

Survey of methods used in public policy analysis and research, including causal modeling, experimental and quasi-experimental designs, measurement issues, analysis of secondary data, and qualitative research methods. (Academic year)



- 290 **Advanced Seminar in Public Policy** (3) Staff  
A capstone seminar limited to master's students in the general program in public policy. Integration of course work through discussion of selected policy issues. (Spring)
- 398 **Advanced Reading and Research** (arr) Staff  
Limited to students preparing for the Doctor of Philosophy general examination.
- 399 **Dissertation Research** (arr) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## RADIOLOGICAL SCIENCES

Professors S.D. Rockoff, E.W. Bradley (Research), D.J. Goodenough, R.C. Reba, C.C. Rogers, D.O. Davis (Acting Chair)  
Associate Professors B.W. Wessels, E.D. Yorke, T.C. Fearon, F. Atkins  
Assistant Professor P.F. Butler

Doctor of Philosophy in the field of radiological sciences with a concentration in medical physics—Prerequisite: A bachelor's degree in physics or the equivalent.  
Required: The general requirements stated under the Graduate School of Arts and Sciences, including Rad 203, 204, 205, 206, 207, 208, 209, and the General Examination.  
Research fields: radiation therapy physics, radiobiology, diagnostic radiology physics, physics of nuclear medicine, health physics, information systems, and biophysics

- 201 **Advanced Topics in Nuclear Magnetic Resonance I** (3) Staff  
Topics include generation of nuclear magnetic resonance signals, Bloch equations, rotating frame analysis, relaxation mechanisms, quadrature phase detection, chemical shift, receiver coil design, image encoding, slice selection shim coils, magnet design, data processing, quality assurance, and zonal and tesseral harmonics mapping. Prerequisite: permission of instructor.
- 202 **Advanced Topics in Nuclear Magnetic Resonance II** (3) Staff  
Recent developments in nuclear magnetic resonance imaging, magnet design, surface coil design, and image quality analysis, related research developments. Prerequisite: Rad 201 or permission of instructor
- 203 **Physics in Medicine I** (3) Fearon  
Atomic and nuclear physics, interactions of charged particles with matter, interactions of electromagnetic radiation with matter, neutron physics, radiation detection and measurement
- 204 **Physics in Medicine II** (3) Staff  
Principles of electricity and magnetism, electronics with applications to x-ray generators, clinical linear accelerators, microwave and patient monitoring equipment, Physics of magnetic resonance imaging and of ultrasound. Applications of computers and computer science in medicine. Prerequisite: Rad 203 or permission of instructor
- 205 **Physics of Diagnostic Radiology, Therapeutic Radiology, and Nuclear Medicine I** (3) Staff  
Design of x-ray units; image formation, digital imaging, computed tomography, nuclear magnetic resonance imaging, ultrasound imaging. Nuclear structure, radioactive decay, nuclear medicine detectors and imaging techniques, counting statistics, internal emitter dosimetry. Prerequisite: Rad 203 or permission of instructor.
- 206 **Physics of Diagnostic Radiology, Therapeutic Radiology, and Nuclear Medicine II** (3) Staff  
High-energy therapy machines, dosimetry theory and applications, concepts of patient treatment planning, Brachytherapy, display and evaluation of dose distributions, electron-beam therapy. Principles and concepts of radiation safety. Prerequisite: Rad 203 or permission of instructor
- 207 **Medical Physics Radiation Laboratory I** (3) Butler, Fearon  
Practicum based on the calibration and quality assurance programs for x-ray equipment used in diagnostic radiology. Prerequisite: Rad 203 or permission of instructor.
- 208 **Medical Physics Radiation Laboratory II** (3) Wessels, Yorke  
Practicum based on the calibration and quality assurance programs for therapeutic radiology. Prerequisite: Rad 203 or permission of instructor

**209 Medical Physics Radiation Laboratory III (3)**

Practicum based on the calibration and quality assurance programs for nuclear medicine. Prerequisite: Rad 203 or permission of instructor.

**RELIGION**

University Professor S.H. Naar

Professors R.G. Jones, H.E. Yeide, Jr (Chair), D.D. Wallace, Jr., A.J. Hildebeitel

Assistant Professors S.A. Quitslund, R.J. Eisen

**Master of Arts in the field of religion**—Prerequisite: the degree of Bachelor of Arts with a major in religion from this University, or an equivalent degree, and reading knowledge of a foreign language related to the program of study (which may be demonstrated after enrollment in the program).

Required: the general requirements stated under the Graduate School of Arts and Sciences. Of the 24 credit hours of required courses (exclusive of the thesis), at least 12 must be in third-group religion courses, a maximum of 9 may be in a closely related field outside the Department of Religion as approved by the department. The Master's Comprehensive Examination must cover three fields (the thesis research must be on one of these three fields) selected from the following: the Hebrew Scriptures, the New Testament, Christianity, Hinduism, Islam, Judaism, history of religion in America, modern religious thought, ethics, sociology of religion, and history of religions. A reading knowledge examination, usually in French or German, is required; however, Hebrew or Greek is acceptable for those students whose thesis area is in the Biblical field and Arabic, Sanskrit or an Eastern language for those whose thesis area is in the history of religions.

**Doctor of Philosophy in the field of American religious history**—See History.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

**209-10 Seminar: Biblical Studies (3-3)**

Main problems of Biblical literary, historical, and theological criticism. Jones

**213 Seminar: Judaism in Late Antiquity (3)**

Selected topics. Eisen

**222 Seminar: Ethics (3)**

Selected topics. Yeide

**235 Seminar: Roman Catholicism in the Modern World (3)**

Important leaders and their ideas in selected developments since 1800: doctrinal, spiritual, biblical, liturgical, and ecumenical. Emphasis on the 20th century. Quitslund

**237 Seminar: Theological Analysis (3)**

Historical and topical study of the development of important ideas in such areas as Christology, ecclesiology, and death. Quitslund

**238 Seminar: Contemporary Judaism (3)**

Selected topics. Eisen

**260 Seminar: Topics in Islamic Studies (3)**

Study of sources and approaches to the investigation of Islam by both Western Islamicists and Muslim scholars, with discussion of the main controversial issues and differences in methods used by various schools of scholarship. Prerequisite: A course on Islam or permission of instructor. Naar

**261 Seminar: Topics in Islamic Thought (3)**

Perennial major issues in Islamic theology, philosophy, and Sufism such as Divine Unity, prophetology, eschatology, religious knowledge, sacred law, and ethics. Prerequisite: A course on Islam or permission of instructor. Hildebeitel

**262 Seminar: History of Eastern Religions (3)**

Selected topics. Wallace

**271 Seminar: American Religious History to 1830 (3)**

Religious thought and life during the Colonial and early National period. Wallace

**273 Seminar: American Religious History Since 1830 (3)**

Religious thought and life from the Civil War to the present. Staff

**291-92 Readings and Research (3-3)**

Investigation of special problems.

**299-300 Thesis Research (3-3)**



## ROMANCE LANGUAGES AND LITERATURES

- 270 **Seminar: Literary History** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 271 **Seminar: Literary Criticism** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 272 **Seminar: Literary Theory** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 273 **Seminar: History of the Language/Linguistics** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 308 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 309 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## RUSSIAN AND EAST EUROPEAN STUDIES

**Program Committee:** S.L. Wolchik (Director), H. Agnew, M.A. Atkin, C.F. Elliott, C.A. Linden, J.R. Millar, C.A. Moser, Y. Olkhovsky, J. Pelzman, P. Roddaway, M.J. Sodaro, R. Thornton

**Master of Arts in the field of Russian and East European studies**—Offered by the Elliott School of International Affairs, this multidisciplinary program gives students a broad grasp of the history, politics, economics, cultures, and languages of Russia and Eastern Europe.

**Prerequisite:** the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. **Before acceptance into the program**, all students must show evidence of satisfactory completion of two years of study of Russian or an appropriate East European language. Degree candidates must demonstrate professional proficiency (ILR R3) in Russian or an appropriate East European language. Students are required to take the ETS examination to demonstrate this proficiency. The language examination is normally taken before the student has completed the first 15 hours of work. It must be taken before the comprehensive examination. Credit for language study is not counted toward degree requirements.

**Required:** the general requirements stated under the Elliott School of International Affairs. The program consists of either a 30-credit-hour option with a thesis or a 36-credit-hour option without a thesis. All students must take three courses in the required core field of Soviet internal and external affairs. Those in the 30-hour program prepare for two additional fields, while those in the 36-hour program prepare for three additional fields. **Master's Comprehensive Examinations must be passed in each of the fields for which the student has prepared.**

All students are expected to have background preparation of at least two courses in Russian history and one course in either Soviet government and politics or Soviet foreign policy. If any of the background courses are lacking, equivalent courses must be taken for graduate credit and can be counted toward degree requirements.

Of the three courses taken in the required core field, one must be in Soviet internal affairs and one in Soviet external affairs. **Courses that satisfy the internal affairs requirement are:** Hist 246, PSc/Hist 250, PSc/Hist 232, and PSc 266 and 267. **Courses that satisfy the external affairs requirement are:** Hist 255 and PSc 263 and 268. Students in the nonthesis program must prepare for a field in East European history or politics; those in the thesis program must take at least one course in East European history or politics.

**Other fields in Russian and East European history or politics** are as follows: (1) Soviet and East European economics (Econ 267, 268, 367); (2) Ideology and political thought (PSc 207, 208); (3) Russian literature and culture (Slav 161-62, 165, 166); (4) Soviet military policy and strategy (Hist 255-56, PSc 269); (5) Modern Russian history (Hist 217, 218, 246); (6) Comparative and international aspects of communism (PSc/Hist 232, PSc 270); (7) East European history (Hist 205, 206); (8) East European government and politics (PSc 264).

265) (9) Advanced Soviet government, politics, and policy (PSc 267 is required). Other courses are IAff 292, PSc 263, 266, 268; Hist 253-54, 259-60, Hist PSc 232, 258. Geog 265.

**Concentration in Russian literature and culture**—Students may choose either the thesis or nonthesis option. They must take the required core field in Soviet internal and external affairs in addition to fields selected from (1) 19th-century Russian literature (Slav 126, 171, 172), (2) Soviet literature (Slav 165, 166, 173, 174); (3) Russian culture (Slav 161-62). For listings of 100-level courses, see the Undergraduate Programs Bulletin.

The following courses are applicable to Russian and East European studies.

- Econ 267 Seminar: Soviet Economy
- Econ 268 Seminar: Economic Theory and Development in Communist Countries
- Econ 367 Seminar: Soviet Planning in Theory and Practice
- Geog 265 Seminar: Geography of the Soviet Union
- Hist 188 History of Chinese Communism
- Hist 205 Readings Seminar: Eastern European History, 1772-1918
- Hist 206 Readings Seminar: Eastern European History, 1919-1945
- Hist 217 Readings/Research Seminar: Russian and Soviet Thought
- Hist 218 Readings/Research Seminar: Soviet Nationalities
- Hist/PSc 232 Comparative Communist Systems I
- Hist/PSc 233 Comparative Communist Systems II
- Hist 237 Readings Seminar: Soviet Foreign Policy, 1917-1964
- Hist 246 Readings/Research Seminar: Modern Russia and Soviet Union
- Hist 253-54 Readings Seminar: History of Sino-Soviet Relations
- Hist 255-56 Readings Seminar: U.S.-Soviet Strategic Relations Since World War II
- Hist/PSc 258 Communist Party of the Soviet Union
- Hist 259-60 Research Seminar: Problems in U.S.-Soviet-Chinese Relations
- IAff 292 Colloquium: The Soviet Union and Eastern Europe
- PSc 207 Readings in Socialism and Communism
- PSc 208 Readings in Marxism-Leninism
- PSc 263 The Soviet Union and Europe
- PSc 264 Governments and Politics of Eastern Europe
- PSc 265 The International Politics of Eastern Europe
- PSc 266 Readings in Soviet Government and Politics
- PSc 267 Soviet Government and Politics
- PSc 268 Soviet Foreign Policy
- PSc 269 Soviet Military Policy and Strategy
- PSc 270 Politics of the People's Republic of China I
- Slav 126 Leo Tolstoy: His Life and Works
- Slav 128 Dostoevsky: The Man and the Artist
- Slav 161-62 Russian Culture
- Slav 165 Modern Russian Literature from the Revolution to World War II
- Slav 166 Modern Russian Literature from World War II to the Present
- Slav 171 Readings in 19th-Century Russian Prose
- Slav 172 Readings in 19th-Century Russian Poetry
- Slav 173 Readings in 20th-Century Prose
- Slav 174 Readings in 20th-Century Poetry

## SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

**Program Committee:** J.M. Logsdon (Director), M.C. LaFollette, R.W. Rycroft, N.S. Vongor, M.B. Wallerstein

**Master of Arts in the field of science, technology, and public policy**—The Elliott School of International Affairs offers an interdisciplinary program that focuses on interactions among scientific development, technological change, and governmental activities, both domestically and internationally. The program is designed to train individuals to understand and manage issues of science and technology policy.

**Prerequisite:** the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. **Required:** the general requirements stated under the Elliott School. The program consists of 36 credit hours, which may include hours of thesis research. Students must pass Master's Comprehensive Examinations in three fields, including science, technology, and public policy (PSc 222, 223, 252 and 253).



elective approved by the advisor), policy analysis (a minimum of two courses, usually drawn from Econ 211, 212, 283, 284, IAff 253, 254, PSc 203, 204, PAd 260, 261, 295, 296), and an elective field (a minimum of two courses, which may be a field offered in another Elliott School program, a field in an academic department, or a field in a specific issue area, such as space policy, trade policy, or environmental policy).

Students must demonstrate basic familiarity with concepts of economic theory, either by having taken prior course work beyond the introductory level or by taking Econ 217-18. Students must also satisfy a tool requirement in statistics or applied statistical methods, usually by successful completion of PAd 296 or Stat 105, 112, 183, or 197. In some cases, proficiency in a foreign language may be judged integral to the student's program of study; proficiency consists of reading knowledge as certified by the appropriate language department and will satisfy the tool requirement. Courses taken to fulfill the tool requirement may not be included in the 36 credit hours required for the degree.

The following graduate courses pertain to science, technology, and public policy.

Econ 237	Economics of the Environment and Natural Resources
Econ 255	Economics of Technological Change
IAff 223	Science, Technology, and International Affairs
Mgt 230	Management of Research and Development
Mgt 232	International Science and Technology
Mgt 233	Emerging Technology
Mgt 235	Technological Entrepreneurship and Innovation
Mgt 239	Seminar: Management of Research and Development
PSc 222	Science, Technology, and Public Affairs
PSc 223	Science, Technology, and Public Policy

## SECURITY POLICY STUDIES

**Program Committee:** R. Spector (Director), W.H. Lewis, B. Nimer, J.P. Rogers, R.W. Rycroft, B.M. Sapin, R. Thornton

**Master of Arts in the field of security policy studies**—This interdisciplinary program, offered by the Elliott School of International Affairs, prepares individuals for professional careers in defense planning and programming, policy formulation and implementation, intelligence evaluation, and arms control specialties.

**Prerequisite:** the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. **Required:** the general requirements stated under the Elliott School. The program consists of 36 credit hours in four fields; there is no thesis option. All students must take four courses in the required core field of national security and defense analysis (PSc 248, 249, IAff 253, 254). At least one field must be selected from the following: (1) International security policy (Hist 255-56, PSc 241, 257), (2) Military history (Hist 228, 229, 230-31), (3) Soviet military policy and strategy (Hist 255-56; PSc 268, 269), (4) Science, technology, and public policy (PSc 222, IAff 232), (5) Applied quantitative techniques (IAff 255-56). **Two elective fields are chosen in consultation with the advisor.** The four fields must represent at least two academic disciplines, no more than 24 hours of course work may be taken in any one department or discipline. Students must pass Master's Comprehensive Examinations in each of their four fields. With permission of the program director, a student may substitute one specially designed field consisting of two courses and submit a research paper in lieu of one Comprehensive Examination.

**Familiarity with economic theory and concepts at the level of Econ 217-18 is required.** The tool requirement must be satisfied by demonstration of proficiency in statistics (at the level of Stat 105, 112, 118, or 183) or reading knowledge of a modern foreign language (as certified by the appropriate language department). In addition to the courses listed below, related courses in geography, public administration and operations research may be taken with approval of the program director or an academic advisor.

The following graduate courses are applicable to security policy studies.

Econ 239	Economics of Defense
Econ 267	Soviet Economy
Econ 268	Economic Theory and Development in Communist Countries
Econ 281-82	International Economics
Econ 283-84	Survey of International Economic Theory and Policy

- Hist 228 Modern Military and Naval History  
 Hist 229 World War II  
 Hist 230-31 Strategy and Policy  
 Hist 253-54 History of Sino-Soviet Relations  
 Hist 255-56 U.S.-Soviet Strategic Relations Since World War II  
 Hist 259-60 U.S.-Soviet-Chinese Relations  
 IAff 223 Science, Technology, and International Affairs  
 IAff 253-54 Defense Policy and Program Analysis  
 IAff 255-56 Applied Quantitative Techniques  
 IAff 293 Colloquium: National Defense Policies and Issues  
 PSc 203 Approaches to Public Policy Analysis  
 PSc 204 Methods of Public Policy Analysis  
 PSc 207 Readings in Socialism and Communism  
 PSc 208 Readings in Marxism-Leninism  
 PSc 222 Science, Technology, and Public Affairs  
 PSc 223 Science, Technology, and Public Policy  
 PSc 238 U.S. Foreign Economic Policy  
 PSc 239 U.S. Foreign Economic Policy Making  
 PSc 240-41 Theories of International Politics  
 PSc 244-45 International Law  
 PSc 248-49 U.S. National Security Policy  
 PSc 257 Arms Control and Disarmament  
 PSc 258 Communist Party of the Soviet Union  
 PSc 263 The Soviet Union and Europe  
 PSc 268 Soviet Foreign Policy  
 PSc 269 Soviet Military Policy and Strategy

## SOCIOLOGY

University Professor A. Etzioni

Professors R.W. Stephens, R.G. Brown (Chair), T.F. Courtless, Jr., P.H.M. Langerman

R.A. Wallace, P. Langton, W.J. Chambliss

Adjunct Professor S.J. Rogers

Associate Professors J.L. Tropea, S.A. Tuch

Assistant Professor R. Weitzer

**Master of Arts in the field of sociology**—Prerequisite: a bachelor's degree with a major in sociology or in an approved related field.

Required: the general requirements stated under the Graduate School of Arts and Sciences. With the approval of the advisor and of the Admissions Advising Committee, students may elect one of the following programs: (1) at least 24 credit hours of graduate work plus a thesis (equivalent to 6 credit hours) and satisfactory completion of a Master's Comprehensive Examination in sociological theory and social research methods; or (2) at least 13 credit hours of graduate course work, satisfactory completion of a Master's Comprehensive Examination in sociological theory, social research methods, and one area of specialization (criminology, sociology of law, gender, medical sociology, health policy, race and ethnicity). Six credit hours may be taken outside the department.

In addition to the hours specified above, all candidates must satisfactorily complete Soc 225 or its equivalent. Candidates must select from the graduate sociology courses as follows: 6 hours chosen from sociological theory (Soc 238 and 239), 6 hours of social research methods (Soc 230 and 232), and 6 hours chosen from one area of specialization.

**Doctor of Philosophy in the field of sociology**—Required: the general requirements stated under the Graduate School of Arts and Sciences. Students must complete 30 to 36 credit hours of graduate course work, of which up to 6 hours may be in Soc 295 and 296. Students must include in their program of study at least 6 hours of course work in sociological theory (Soc 338 and 339) and 9 hours in research methods (Soc 231, 232, and a course chosen from either a qualitative group [AmCv, Anth, Hist 197, WStu 221, or another approved course] or a quantitative group [Stat 118, Educ 281, or another approved course]).

Students must satisfactorily complete the General Examination in sociological theory, social research methods, and one area of specialization.

**Note:** Courses at the 300 level are for doctoral students in sociology. Other graduate students are permitted at the discretion of the department or the instructor.



- 203 **Social Organization** (3) Staff  
Introduction to sociological concepts and perspectives. An examination of empirical studies that utilize different theoretical perspectives. Recommended for students offering sociology as a supporting field. (Fall)
- 210 **Theoretical Foundations of Political Sociology** (3) Lengermann  
Sociological theory on the relationship of politics to the wider social system. Emphasis on concepts of power, alienation, ideology, political stability, conflict, and change.
- 225 **Theories of Social Change** (3) Lengermann  
Review of sociological writings on modernity—its emergence in the North Atlantic societies, its consequences for third world societies, and its future. (Spring)
- 230 **Sociological Research Methods** (3) Tuch  
Systematic survey of sociological research strategies and review of the literature in this area. Recommended for students with only one undergraduate course in research techniques. (Fall)
- 231 **Seminar: Advanced Research Methods** (3) Tuch  
Intensive study and evaluation of a few sophisticated research techniques and of new developments in the methodology of social research. Prerequisite: Soc 230; Mgt 225 or equivalent. (Spring)
- 232 **Qualitative Methodology: Doing Field Research** (3) Chambliss, Langton, Weitzer  
Practical application of data collection methods in natural settings, observation, participant observation, and field experience. Emphasis on implementing research projects by using these methods for purposes of developing empirically grounded theory.
- 235 **Seminar: Sociology of Education** (3) Wallace, Tropea  
Sociological theories on relationships between education and the economic, political, social, and cultural character of society; examination of social factors relating to such topics as educational achievement, the changing functions of educational structures, and the roles of teacher and student. (Spring, odd years)
- 238 **Seminar: Development of Sociological Theory** (3) Lengermann  
Development of sociology from the early 1800s to the 1920s. Intensive analysis of the classical theoretical statements. (Fall)
- 239 **Seminar: Modern Sociological Theory** (3) Lengermann, Wallace  
Intensive examination and evaluation of contemporary schools of sociological theory in Europe and America. Advanced analysis of theoretical perspectives. Prerequisite: Soc 238. (Spring)
- 240 **Sociology of Work and Occupations** (3) Langton  
Review of major theoretical and empirical developments in industrial sociology; varying approaches to the study of work and occupations. (Fall)
- 241 **Sociology of Work and Organizations** (3) Langton  
Theory of complex organizations relative to work in industry, government, and business; examination of basic processes such as decision making, recruitment, allocation of authority, informal organization, and interorganizational relations. (Spring)
- 242 **Seminar: Medical Sociology** (3) Langton  
Study of the social structure of health care and the interplay of the various health professions; examination of social factors and processes related to the etiology and treatment of illnesses. Prerequisite: permission of instructor. (Fall)
- 245 **Seminar: Race Relations** (3) Tuch  
Systematic analysis of race relations and inequality, primarily in the United States. Topics include current status and recent trends in inequality, the institutional and organizational patterning of discrimination, the structure of white racial attitudes, theoretical perspectives on race relations, and selected policy issues. (Spring)
- 258 **Seminar: Deviance and Control** (3) Weitzer  
Examination of major theories and research in the field of deviance and social control, with special emphasis on recent empirical advances and comparative perspectives.

- 259 **Law and Criminology: Search for the Causes of Criminal Behavior** (3) Chambliss, Courtless, Tropé  
The role that criminological knowledge of crime causation may play in developing effective alternative social and legal devices in controlling deviant behavior. Same as Law 478. (Fall)
- 261 **Law of Criminal Corrections: Society's Response to the Criminal Offender** (3) Chambliss, Courtless, Tropé  
Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, research findings concerning effectiveness of these responses. Same as Law 479 (Spring)
- 263 **Seminar: Law and Society** (3) Chambliss, Courtless  
Selected problems in law as an instrument of social policy; emphasis on the organization of legal decision-making processes. (Summer)
- 265 **Selected Topics in Criminal and Juvenile Justice Policy** (3) Chambliss, Courtless, Tropé  
Development of a systematic perspective on policies affecting the juvenile and criminal justice systems. Topics will include adjudication, disposition, diversion, and sentencing. (Spring, even years)
- 270 **Seminar: Foundations of Social Inequality** (3) Stephens  
Review of the principal concepts and theories used to explain social inequality at both macro and micro levels. Examination of principal bases of inequality and their representative forms. (Prerequisite course for students electing social inequality as a major field.) (Fall)
- 271 **Seminar: Gender and Society** (3) Lengermann, Wallace  
An examination of quantitative and qualitative research in the field of gender with emphasis on current empirical research. (Fall)
- 272 **Seminar: Theoretical Perspectives on Gender** (3) Lengermann, Wallace  
Review of significant theoretical writings on gender and gender inequality with primary focus on contemporary sociological statements. (Spring)
- 280 **The Sociology of Aging** (3) Brown  
Impact of current demographic changes (size and composition of the aged population) on the existing structure of American society. (Spring)
- 281 **Problems of Growing Old in American Society** (3) Brown  
Analysis of the bases of the social status of the aged in American society, the impact on older people of characteristic situational changes in later life, and societal responses to those impact areas defined as social problems. (Fall)
- 290 **Principles of Demography** (3) Boulter  
Same as Econ/Geog/Stat 290.
- 291 **Methods of Demographic Analysis** (3) Boulter  
Same as Econ/Geog/Stat 291.
- 295 **Research** (arr.) Staff  
Independent study and special projects. Before permission is granted to register for Soc 295, the student must submit a written plan of study for the approval of the staff member of the department who will be directing the research. May be repeated once for credit. (Fall and spring)
- 299-300 **Thesis Research** (3-3) Staff  
332 **Seminar: Processes of Inquiry** (3) Staff  
Development and critical review of students' research projects with the objectives of aiding conceptualization and developing research design. Consideration of the interplay between theory and methods. Prerequisite, at least 3 credit hours each of graduate theory and graduate methods. May be repeated for credit. (Fall and spring)
- 333 **Advanced Seminar: Classical Sociological Theory** (3) Chambliss, Lengermann, Wallace  
Intensive investigation of special topics in classical sociological theory. Prerequisite, Soc 238 or its equivalent or permission of instructor. (Spring)
- 339 **Advanced Seminar: Modern Sociological Theory** (3) Chambliss, Lengermann, Wallace  
Intensive investigation of special topics in modern sociological theory. Prerequisite, Soc 239 or its equivalent or permission of instructor. (Fall)



- 342 Advanced Seminar on Health Policy (3)** Langton  
Review of how health policy is made and implemented, how health policy research is done; in-depth review of selected topics and completed policy studies, primarily for students in the medical health policy field. Prerequisite: Econ 248, Soc 242 or consent of the instructor. (Spring)
- 352 Selected Topics in Sociology (3)** Staff  
Intensive investigation of special topics in sociological research. May be repeated for credit. (Spring)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

### SPECIAL EDUCATION

See Teacher Preparation and Special Education.

### SPEECH AND HEARING

Professors J.W. Hillis, L.S. Bowling, C.W. Linebaugh (Chair)  
Associate Professors M.D.M. Brewer, J.R. Regnell, W.P. Cupples  
Associate Professorial Lecturers L.B. Beck, J.D. Schafer, A.M. Schmidt  
Assistant Professorial Lecturer C.L. Person  
Assistant Clinical Professor L.O. Shekim  
Clinical Instructors S.D. Hanna, L. Jacobs-Condit, P. Mason, A.A. Pietranton, D.A. Santa, R.T. Walton, S. Yaffe-Oziel

**Master of Arts in the field of speech-language pathology and audiology—Prerequisite:** the degree of Bachelor of Arts with a major in speech and hearing science from this University, or an equivalent degree, and an appropriate score on the Aptitude Test of the Graduate Record Examination.

**Required:** the general requirements stated under the Graduate School of Arts and Sciences. The program of study consists of 39 credit hours of approved course work without a thesis or, with the approval of the department, 30 credit hours of approved course work plus a thesis (equivalent to 6 credit hours). All students must satisfy the academic and supervised practicum requirements of the Certificate of Clinical Competence awarded by the American Speech-Language-Hearing Association and satisfactorily complete the Master's Comprehensive Examination.

As one component of the Master's Comprehensive Examination, all students must take the National Examination in Audiology or in Speech Pathology available through the Educational Testing Service. Students must request the Testing Service to send copies of test scores to the Department of Speech and Hearing to be used in partial fulfillment of the general requirement in the Graduate School of Arts and Sciences for the Master's Comprehensive Examination. Test results must reach the department at least three weeks before graduation.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 201 Clinical Practicum in Communication Disorders (1 to 3)** Bowling, Cupples  
Supervised clinical practice in the evaluation and treatment of speech, language, and hearing disorders; development of treatment plans and writing of evaluation and progress reports. Admission by permission of the instructor. May be repeated for up to 6 credit hours. (Fall, spring, and summer)
- 267 Industrial Audiology (3)** Bowling  
Theories and processes pertinent to communicative disorders related to industrial noise. Consideration of hearing conservation programs, environmental assessment, and relevant legislation. (Fall)
- 268 Selected Topics in Clinical Audiology (1 to 3)** Bowling  
Advanced study of selected theoretical and clinical issues. May be repeated, but may not be taken for more than a total of 3 credit hours of credit. (Fall, spring, and summer)

- 269 **Management of Clinical Services in Communication Disorders** (3) Stat  
Planning, management, and operation of clinic, hospital, school, and private  
practice services in speech-language pathology and audiology. Consideration of  
personnel, financial, and space issues; ethical and legislative concerns. Fall  
Bowling
- 270 **Pediatric Audiology** (3) Bow  
Embryologic development of the auditory mechanism. Nature and causes of  
auditory impairments; audiometric techniques used to measure hearing in chil-  
dren. Laboratory fee, \$12. (Spring)
- 271 **Neurodevelopmental Disorders of Speech Production** (3) Person  
Evaluation and treatment of infants and children with neurodevelopmental  
speech disorders, including cerebral palsy and developmental apraxia of speech.  
Emphasis on management of prespeech oral motor and feeding impairments.  
Laboratory fee, \$12. (Summer)
- 272 **Disorders of Articulation and Phonology** (3) Schmidt  
Nature, causes, diagnosis, and treatment of developmental articulatory and pho-  
nological impairments; identification and modification of regional dialects and  
foreign accents. Laboratory fee, \$12. (Fall)
- 273 **Pediatric Language Impairments: Identification and Diagnosis** (3) Cupples  
Review of current theoretical approaches to evaluation; differential diagnosis of  
developmental language delays and disorders, review of available standardized  
tests, observation and testing experience. Laboratory fee, \$12. (Fall)
- 274 **Pediatric Language Impairments: Treatment** (3) Cupples  
Review of current therapeutic models; use of diagnostic information for design-  
ing a treatment plan, monitoring progress, coordinating language remediation  
with classroom and additional resource support; experience through monitoring  
ongoing language treatment. Laboratory fee, \$12. (Spring)
- 275 **Evaluation and Treatment of Speech Fluency Disorders** (3) Hillis  
Procedures for clinical assessment of stuttering and other disorders of speech rate  
and rhythm. Review of historical and current methods for treatment. Laboratory  
fee, \$12. (Spring)
- 276 **Seminar: Speech Fluency Disorders** (3) Hillis  
Consideration of stuttering and other disorders of speech rate and rhythm from  
developmental, linguistic, physiological, and psychosocial points of view.  
(Fall)
- 277 **Clinical Aphasiology** (3) Linebaugh  
Current neurolinguistic theories. Differential diagnosis and clinical manage-  
ment of aphasia and communicative impairments resulting from right hemisphere  
damage, traumatic brain injury, and dementia. Laboratory fee, \$12.  
(Fall)
- 278 **Applied Neurolinguistics** (3) Linebaugh  
Neurolinguistic and cognitive processes of language formulation and compre-  
hension. Application of neurolinguistic models to neurogenic communicative  
disorders. (Summer)
- 279 **Motor Speech Disorders** (3) Linebaugh  
Methods for assessing motor speech disorders and their physical, acoustic, and  
perceptual characteristics. Differential diagnosis and treatment of apraxia of  
speech, the dysarthrias, and dysphagia. Laboratory fee, \$12. (Spring)
- 280 **Evaluation and Treatment of Voice Disorders** (3) Reese  
Normal anatomy and physiology of the human vocal mechanism. Nature, causes,  
and clinical management of functional and organic voice disorders, including  
laryngectomy. Laboratory fee, \$12. (Fall)
- 281 **Seminar: Voice Disorders** (3) Reese  
Advanced study of selected theoretical and clinical issues regarding voice dis-  
orders. (Summer)
- 282 **Aural Rehabilitation** (3) Brower  
Habituation rehabilitation of the hearing impaired, including auditory training,  
speech reading, hearing aids, assistive listening devices, communication strate-  
gies, and counseling. Laboratory fee, \$12. (Fall)
- 283 **Clinical Audiology I** (3) Schrier  
Psychoacoustic principles and methods underlying the assessment of auditory  
disorders. Anatomy and physiology of the auditory mechanism. Laboratory  
fee, \$12. (Fall)



**285 Hearing Aids (3)**

Black

Discussion of hearing-aid characteristics and electroacoustic measurements; hearing-aid effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. Laboratory fee, \$12. (Spring)

**286 Electrophysiologic Assessment of Hearing (3)**

Schafer

Study of electrophysiologic techniques used to assess cochlear and retrocochlear function. Theories and clinical applications of vestibular tests, auditory brain-stem-evoked responses, and electrocochleography. Laboratory fee, \$12. (Spring)

**287 Central Auditory Processes (3)**

Bowling

Factors affecting auditory perception and comprehension. Identification and clinical management of central auditory processing disorders in children and adults. Laboratory fee, \$12. (Fall)

**288 Psychoeducational Management of the Hearing Impaired (3)**

Brewer

Study of the psychosocial and educational effects of hearing loss. Assessment, remediation, and management approaches related to the education of the hearing impaired. Laboratory fee, \$12. (Summer)

**289 Clinical Audiology II (3)**

Schafer

Audiological assessment of middle ear function, speech audiometry, and management of diagnostic information. Laboratory fee, \$12. (Fall)

**290 Selected Topics in Developmental Language Disorders (1 to 3)**

Staff

Advanced study of selected theoretical and clinical issues regarding developmental language disorders. May be repeated but not for more than a total of 6 credit hours. (Summer and fall)

**292 Research Methods in Speech and Hearing (3)**

Hillis

Methods for the design and execution of research in speech and hearing. Topics include hypothesis formulation, literature review, proposal preparation, data acquisition and analysis, and preparation of final research reports. Laboratory fee, \$12. (Spring)

**295 Independent Research in Speech, Language, and Hearing (arr.)**

Staff

**299-300 Thesis Research (3-3)**

Staff

**STATISTICS/COMPUTER AND INFORMATION SYSTEMS**

Professors H.W. Lilliefors, A.D. Kirsch (Chair), J.L. Gastwirth, S.W. Greenhouse (Emeritus), N.D. Singpurwalla, R.T. Smythe, J.M. Lachin III, K.K.G. Lan

Professorial Lecturer W.R. Nunn

Associate Professors P.F. Thall, S.E.F. Schlesselman (Research), H.M. Mahmoud, T.K. Navak, R.P. Bain (Research)

Associate Professorial Lecturer J.S. Wu

Assistant Professors D.A. Grier, B. Toman, C. Hurley, R.G. Epstein

Master of Science in the field of applied statistics. Master of Science in the field of statistical computing, or Master of Arts in the field of mathematical statistics—The program of study consists of 30 to 36 credit hours of course work without a thesis. In exceptional cases the department may approve a program of study consisting of 24 to 30 credit hours of course work plus a thesis, equivalent to 6 additional credit hours. Candidates must pass a written Master's Comprehensive Examination. For prerequisites and additional requirements, see below.

Master of Science in the field of applied statistics—Two options are provided: a general curriculum in applied statistics and a concentration in biostatistics. Prerequisite: Math 31, 32, 33, and 124; Stat 118.

Required: the general requirements stated under the Graduate School of Arts and Sciences and 30 to 36 credit hours of course work. If the student has not previously had Stat 221 or 217-18. Courses are selected in consultation with the advisor.

a) General curriculum in applied statistics—The core curriculum includes Stat 201-2 and 210. An additional 21 credit hours must be chosen in consultation with the advisor.

b) Concentration in biostatistics—The core curriculum includes Stat 187, 201-2, 210, 225-26, 227, 231. Twelve additional credit hours are electives of which 6 hours must be in statistics and 6 hours must be in health sciences or related areas. All electives must be approved by the advisor.

**Master of Science in the field of statistical computing**—Prerequisite: Math 31, 32, 33 and 124; Stat 118, 130, 131, and 132, or demonstrated proficiency in advanced programming techniques.

Required: the general requirements stated under the Graduate School of Arts and Sciences and 30 to 36 credit hours of course work. The 24-hour core consists of 201–2, 203, 204, 207–8, 210, and 283. Students entering the program without a strong background in statistics will be expected to take at least 3 credit hours of options in statistics.

**Master of Arts in the field of mathematical statistics**—Prerequisite: a bachelor's degree with a major in statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent required courses, those courses must be taken as prerequisite to graduate study. Additional prerequisites include Math 139 and 140. Under certain circumstances some prerequisites may be waived; check with the department.

Required: the general requirements stated under the Graduate School of Arts and Sciences, including Stat 201–2 and 217–18. The remaining 18 credit hours must be selected in consultation with the advisor.

**Doctor of Philosophy in the field of statistics**—Prerequisite: A master's degree in statistics or a related discipline. The main requirement is a strong background in mathematics including courses in advanced calculus, linear algebra, and mathematical statistics (similar to Stat 201–2). Some deficiencies may be made up concurrently during the student's first year. In some instances, a student may enter the Ph.D. program with a bachelor's degree.

**Required:** The general requirements stated under the Graduate School of Arts and Sciences, including satisfactory completion of (1) Stat 201–2, 217–18, 257, 258, 263, 264 and at least two courses chosen from among Stat 223, 262, 265–66, and 273–74; (2) a minimum of 18 additional credit hours as determined by consultation with the departmental doctoral committee; (3) proficiency in computer languages as demonstrated by course work or an examination; (4) the General Examination, consisting of two parts: (a) a written qualifying examination that must be taken within 24 months from the date of enrollment in the program and is based on the four-course core (Stat 257, 258, 263, 264) and (b) an examination to determine the student's readiness to carry out the proposed dissertation research; and (5) a dissertation demonstrating the candidate's ability to do original research in one of the following fields: Bayesian inference, biostatistics, design of experiments, multivariate analysis, nonparametric statistics, probability (theoretical or applied), reliability theory, robust methods, sampling, statistical computing, statistical inference, stochastic processes, and time series.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

### 201–2 Mathematical Statistics (3–3)

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: Math 33 and 124. (Academic year)

### 203 Fundamental Algorithms and Their Analysis (3)

Basic tools for the study of algorithms, including asymptotic analysis and recurrence relations. Graphs and their representation in a computer. Some NP-complete graph problems. Open to qualified seniors. Prerequisite: Math 124, Math 113; Stat 131.

### 204 Expert Systems (3)

Advanced study of machine intelligence, with special emphasis on expert systems. Topics include advanced systems for problem solving and automated reasoning, reasoning in the presence of uncertainty, search control, backward and forward rule chaining, connectionist artificial intelligence. Prerequisite: Stat 147. (Spring)

### 206 Multivariate Methods in the Behavioral Sciences (3)

Application of multivariate analysis to data of the social sciences. Techniques covered include factor analysis, cluster analysis, discriminant analysis, and other topics. Prerequisite: Stat 105 or 118, and prior permission of the instructor. Not open to graduate students in statistics.

### 207 Methods of Statistical Computing I (3)

Error analysis, computational aspects of linear models, sweep operator, random number generation, simulation, resampling, Optimization, numerical integration.



- tion (Gaussian quadrature, Simpson's rule); E-M algorithm. Prerequisite: Stat 118, 129, 201-2; Math 124.
- 208 **Methods of Statistical Computing II (3)** Grier  
Generalized curve fitting, splines, spline smoothers; numerical linear algebra, including matrix decomposition and eigenvalue problems, optimization techniques, including maximum likelihood estimation; graphics for data display, including projections, convex hulls, point clouds, hidden line removal.
- 210 **Data Analysis (3)** Lachin, Thall  
A study of statistical methods for data analysis, using computerized statistical procedures. Multiple regression and the general linear model, discrimination and classification, the analysis of contingency tables, and nonparametric methods. Prerequisite: Stat 118 and either Stat 183 or 197 or demonstrated proficiency in computer programming. (Spring)
- 215-16 **Applied Multivariate Analysis (3-3)** Staff  
Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 119, 157-58, and Math 124. (Alternate academic years)
- 217-18 **Advanced ANOVA and Experimental Design (3-3)** Thall, Toman  
Advanced theory and application of general linear parametric model to experimental designs, estimation, and hypothesis testing. Prerequisite: Stat 157-58 or 201-2; Math 124. (Academic year)
- 221 **Design of Experiments for Behavioral Sciences (3)** Kirsch, Toman  
Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 118 or equivalent and permission of instructor. Not open to graduate students in mathematical statistics. (Spring)
- 223 **Bayesian Inference (3)** Singpurwalla  
Systematic development of Bayesian viewpoint, with applications to the classical problems of statistics. Prerequisite: Stat 201-2.
- 225 **Fundamentals of Biostatistics (3)** Lachin, Lan  
Statistical methods for the design and analysis of biomedical research studies, including the randomized clinical trial and other observational and epidemiological studies. Evaluation of power and sample size, randomization, analysis of binary data and logistic regression. Prerequisite: Stat 201-2 or permission of instructor. (Fall, alternate years)
- 226 **Advanced Biostatistics (3)** Lachin, Lan  
Parametric and nonparametric statistical methods for the analysis of longitudinal data (repeated measures). Empirical Bayes methods. Methods for sequential analysis of emerging data, including group sequential analysis, Bayesian methods, and stochastic curtailment. Prerequisite: Stat 201-2 or permission of instructor. (Spring, alternate years)
- 227 **Survival Analysis (3)** Lachin, Lan, Smythe  
Parametric and nonparametric methods for the analysis of events observed in time (survival data), including Kaplan-Meier estimate of survival functions, logrank and generalized Wilcoxon tests, the Cox proportional hazards model and an introduction to counting processes. Prerequisite: Stat 201-2 or permission of instructor. (Fall, alternate years)
- 231 **Contingency Table Analysis (3)** Staff  
A study of the theoretical bases underlying the analysis of categorical data. Prerequisite: Stat 201-2 or 257-58
- 242 **Advanced Statistical Problems in Economic Analysis (3)** Gastwirth  
Applications of advanced theory to economic data.
- 257 **Probability (3)** Smythe  
Probabilistic foundations of statistics, probability distributions, random variables, moments, characteristic functions, modes of convergence, limit theorems, probability bounds. Prerequisite: Stat 201-2, knowledge of calculus through functions of several variables and series. (Fall)
- 258 **Distribution Theory (3)** Gastwirth  
Special distributions of statistics, small and large sample theory, order statistics, and spacings. Prerequisite: Stat 257. (Spring)

- 259-60 **Advanced Mathematical Probability (3-3)**  
Measure theory, probability spaces, random variables, probability distributions, sequences and sums of random variables, conditioning, limit theorems, martingales. Prerequisite: advanced calculus and permission of instructor (Alternate academic years)
- 261 **Sequential Design and Analysis (3)**  
Wald's theory of sequential designs, optional stopping, choice of sequential experiments. Prerequisite: Stat 201-2.
- 262 **Nonparametric Inference (3)**  
Inference when the form of the underlying distribution is unspecified. Prerequisite: Stat 201-2.
- 263 **Advanced Statistical Theory I (3)**  
Linear models, decision theoretic estimation, classical point estimation. Prerequisite: Stat 201-2. (Fall)
- 264 **Advanced Statistical Theory II (3)**  
Asymptotic theory, hypothesis testing, confidence regions. Prerequisite: Stat 201-2, 257. (Spring)
- 265 **Multivariate Analysis (3)**  
Multivariate normal distribution, Hotelling's  $T^2$  and generalized  $T^2$ , Wishart distribution, discrimination and classification. Prerequisite: Stat 201-2 and Math 124.
- 266 **Topics in Multivariate Analysis (3)**  
Multivariate analysis of variance, principal components, canonical correlation, factor analysis. Prerequisite: Stat 265.
- 273-74 **Stochastic Processes (3-3)**  
Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 189-90, and 201-2 or 257-58 (Alternate academic years)
- 275 **Econometrics I: Introduction (3)**  
Same as Econ 275. (Fall)
- 276 **Econometrics II: Simultaneous Equations Models (3)**  
Same as Econ 276. (Fall)
- 281 **Advanced Time Series Analysis (3)**  
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate and multivariate time series. Statespace or Kalman filter models, spectral analysis of multiple time series. Theory and applications using the University computer. Prerequisite: Math 33, Stat 201-2 or equivalent (Spring)
- 282 **Time Series Analysis II: Statistical Inference (3)**  
Multivariate normal processes, spectral estimation, tests of hypotheses, regression, discrimination filtering, spectral analysis of variance. Prerequisite: Stat 281
- 283 **Advanced Statistical Packages (3)**  
Use of advanced computer systems to solve statistical problems. Extension of concepts of Stat 183, including macro programming, multivariate analysis, exploratory data analysis, interactive computer graphics, symbolic mathematics. Examples of possible packages include S, GLIM, SAS, MacSvma. Prerequisite: Stat 183 or 210 or permission of instructor.
- 287-88 **Modern Theory of Sample Surveys (3-3)**  
Application of statistical theory to the sampling of finite populations. Simple, stratified, cluster, double and subsampling. Special topics, including nonresponse, populations and randomized response. Prerequisite: Stat 91 and Math 42 or equivalent. (Academic year)
- 289 **Seminar (3)**  
Admission by permission of instructor. (Fall and spring)
- 290 **Principles of Demography (3)**  
Same as Econ 290
- 291 **Methods of Demographic Analysis (3)**  
Same as Econ 291
- 295 **Reading and Research (3)**  
May be repeated once for credit
- 298 **Seminar: Special Topics (3)**



- 299-300 **Thesis Research (3-3)** Staff  
(Fall and spring)
- 378 **Seminar: Topics in Econometrics (3)** Staff  
Same as Econ 378
- 398 **Advanced Reading and Research (arr)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination.  
May be repeated for credit
- 399 **Dissertation Research (arr)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professor H.J. Davis

Associate Professors D.J. Lenn (Chair), J.B. Thurman, J. Cook, E.J. Englander

Assistant Professors D.R. Kane, C.C. Shepherd, Jr., J.H. Beales III, D.K. Davidson (Visiting), R.M. LeNoir

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy. Please note that the following courses were formerly offered by the Business Administration Department.

- 201 **Business and Public Policy (3)** Lenn, Englander, Kane, Shepherd  
This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Political, legal, economic, social, and ethical forces acting on business. Interaction of the market system and public policy process in the development of law and regulation (Fall, spring, and summer)
- 202 **Business-Government Relations (3)** Lenn, Englander  
Historical and philosophical foundations of the business-government relationship. Regulation, international trade, and corporate political activities. Public policy issues facing business and the business community's political response. Prerequisite: SMPP 201 or equivalent. (Fall and spring)
- 203 **Federal Government Regulation of Society (3)** Tolchin  
Same as PAd 216.
- 204 **Regulation of Business: Administrative Law (3)** Kane  
Principles of federal regulation of business through administrative bodies. Analysis of sources and limits of the powers and prerogatives of administrative bodies in adjudicative, executive, and rule-making functions. Theoretical and practical aspects of regulations, other topics. Prerequisite: SMPP 201, 202 or equivalent. (Fall)
- 205 **Business Representation and Lobbying (3)** Joseph  
Strategies, tactics, and techniques used by business in representing itself to the legislative and executive branches and regulatory agencies of the federal government. Legal and practical constraints. Ethical considerations. (Fall)
- 206 **Applied Microeconomics (3)** Beales  
Applications of economic theory to public and private decisions affected by the economic and general business environment. Demand, production, costs, profits, investments, inventory, market structure. Prerequisite: Econ 217 and Mgt 270 or equivalents. (Spring)
- 208 **Macroeconomic Policy and Business (3)** Beales  
Interpretation of economic conditions in the short and long run; theory and practice of monetary and fiscal policy; applications of business conditions analysis to business planning, management, and policy. Prerequisite: Econ 218 and Mgt 270 or equivalents. (Fall)
- 209 **Seminar: Business Economics and Public Policy (3)** Lenn, Englander  
Analysis and discussion of selected issues by students and representatives of government and business. Prerequisite: SMPP 201, 202, or equivalent. (Spring)
- 290 **Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 291 **Ethics and Business (3)** Griffith, Lenn  
Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, political advertising;

- development of theory of corporate social responsibility. Same as Phil 235 (Spring)
- 292 **New Venture Initiation** (3) Holland  
Theory, history, and practice of entrepreneurship and small business management. Essentials of planning a new business venture, sources of financing, evaluation of alternative new business ventures, and analysis of business conditions needed to get started. Prerequisite: Completion of Common Body of Knowledge courses. (Fall and spring)
- 293 **American Business History** (3) Becker  
The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the period since industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as Hist 220. (Fall)
- 295 **Research Methods** (3) Davis  
Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation and presentation of findings. Use of computer library programs and preparation of a formal business report. (Fall)
- 297 **Strategy Formulation and Implementation** (3) Davis, Thurman, Cook, LeScoe  
An integrative approach to strategic management, stressing the general manager's perspective. Strategy formulation, implementation of strategy and policy and evaluation and control of strategy in various types of organizations. Prerequisite: M.B.A. degree status (Fall and spring)
- 298 **Directed Readings and Research** (3) Star  
Supervised readings or research. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)
- 299 **Thesis Seminar** (3) Star
- 300 **Thesis Research** (3) Star
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3)  
An analysis and critique of alternative theoretical frameworks for describing, understanding, and predicting the nature, values, and actions of American public and private institutions. Problems, potentials, and alternatives for structuring public and private institutional arrangements to meet the needs of society. Prerequisite: doctoral degree candidate status (Fall and spring) Star
- 391 **Seminar: Business Management** (3)  
Examination of major current issues, both theoretical and empirical, affecting the development of the business enterprise. Topics to be announced. Emphasis on policy and strategic issues affecting the total enterprise (Offered as the demand warrants) Star
- 398 **Advanced Reading and Research** (arr.) May be repeated for credit
- 399 **Dissertation Research** (arr.) May be repeated for credit

### TEACHER PREPARATION AND SPECIAL EDUCATION

Professors R.K. Ives, J.R. Shotel, M.S. Castleberry, R.N. Ianacone (Chair), G.L. Horowitz, A.J. Mazur, N.J. Belknap, M.B. Proun, H. Wachs (Research)

Associate Professors J.M. Taymans, L.R. Putnam, L.L. West

Adjunct Associate Professor F.E. Hesser

Assistant Professors S.S. Beck, I.H. Mauro, N.B. Paley, M. Garza-Lubeck

Adjunct Assistant Professors S.M. Cahill, P. Dupont, C.A. Kochhar, W.T. Capps, M. Jarrett

S. Kostaki-Gailey, G. Schwartz, M.S. Tennille

Instructor M.H. Futrell

Adjunct Instructors M.A. Lucia, M.L. Ortenzo, A.M. Solomon, J.A. Wagner, J.T. Kavack, P. LeConte, S.S. Magula, C. Rothenbacher

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, and Doctor of Education



## TEACHER EDUCATION

Department prerequisite: A degree from an accredited institution is prerequisite to all 200-level courses in teacher education. Undergraduate students in their senior year may enroll in 200-level courses with permission of the instructor. TrEd 246 through 251 are special methods courses that may be taken only after substantial preparation in the teaching field concerned; permission of the program coordinator is required before registration. TrEd 245 is prerequisite to all special methods courses.

- 205 **Foundations of Curriculum Development** (3) Staff  
For experienced teachers. Curriculum research and design, issues and trends, comparison of curriculum patterns, curriculum development in subject areas, and consideration of current field-related problems. (Fall)
- 216 **Recent Developments in Teaching Social Studies** (3) Staff  
For experienced educational personnel. Research techniques, materials, and innovative programs relating to the effective teaching of social studies. Admission by permission of instructor.
- 217 **Recent Developments in Teaching Science** (3) Staff  
For experienced educational personnel. Research techniques, materials, and innovative programs relating to the effective teaching of science. Admission by permission of instructor.
- 218 **Recent Developments in Teaching Mathematics** (3) Staff  
For experienced educational personnel. Research techniques, materials, and innovative programs relating to the effective teaching of mathematics. Admission by permission of instructor.
- 220 **Selected Topics in Teacher Education** (arr.) Staff  
Topics announced in the *Schedule of Classes*.
- 221 **Developmental Reading: Emergent Literacy** (3) Putnam  
Focus on research into the literacy experiences and emergent reading and writing behaviors of young children in the first six years of life, along with implications for developing "literate environment" preschool and kindergarten classrooms.
- 222 **Foundations of Reading Development: K-Adult** (3) Horrworth  
Basic theories and processes of reading acquisition and development, linguistic, cognitive, developmental, social, and affective bases of reading, varieties and influences of media and instructional strategies.
- 223 **Reading Instruction in Content Areas: Elementary, Intermediate, and Secondary Schools** (3) Horrworth  
Emphasis on basic group instructional methods and media, teaching demonstrations of basic reading and study skills in content subjects; study of readability of content materials; research and application of formulas. (Fall)
- 224 **Diagnostic Teaching of Reading: K-6** (3) Horrworth  
Classroom teaching and testing techniques for elementary teachers; administration, scoring, and interpretation of informal tests and other measures of evaluation; selecting and planning activities suitable for correction of specific problems. Prerequisite: at least one previous course in reading. (Spring)
- 225 **Measuring Mental Functions** (3) Johnson  
Administering, scoring, interpreting, and reporting the Wechsler Intelligence Scale for Children - Revised (WISC-R) and the Wechsler Intelligence Scale for Adults - Revised (WAIS-R). Material fee: \$25. (Fall and spring)
- 226 **Diagnostic Teaching of Reading in Secondary School** (3) Horrworth  
Application of instructional strategies and techniques presented in Educ 223 and 224. Construction of informal tests; administering, scoring and interpreting informal and standardized tests; study and evaluation of materials; teaching strategies for on-grade students and for those with reading problems. (Spring)
- 227 **Current Issues in Elementary Education** (3) Beck  
Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school. (Fall)
- 228 **Instructional Areas in Elementary Education** (3) Beck  
Current trends and research in reading, language arts, social studies, mathematics, science, music, art, and physical education. (Spring)
- 230 **Foundations of Early Childhood Education** (3) Staff  
Historical developments, philosophy and objectives of nursery schools, kindergartens, and day care centers; exploration of contemporary programs and models.

- with curriculum implications for schools in the United States and abroad. (Fall) Staff
- 231 **Community Resources and Materials for the Young Child** (3) Staff  
Interaction with community agencies for service, resources, and equipment; physical facilities, play activities, curriculum materials, and methods for teaching the infant and young child. (Spring)
- 232 **Early Childhood Curriculum** (3) Staff  
Rationale, development, content, approaches, programs, and materials in language arts, mathematics, science, health, social studies, and aesthetic education. (Fall)
- 233 **Role of the Professional in Early Childhood Education** (3) Staff  
Planning, reporting, maintaining records, teacher-child and teacher-family interaction, diagnosis and evaluations, working with paraprofessionals and parents. Emphasis on total classroom environment. (Spring)
- 234 **Professional Internship in Secondary Education** (6) Staff  
Admission by permission of instructor.
- 235 **Professional Internship in Elementary Education** (9) Beck, Paine  
Supervised internship, required seminar. Admission by permission of instructor. Prerequisite: TrEd 111 or equivalent. (Spring)
- 236 **Analysis of Teaching** (3) Staff  
Teaching viewed as a system; component aspects are examined with a view toward developing a critical method of analysis. Material fee, \$25. (Spring)
- 237 **Practicum in Early Childhood Education** (3 to 6) Staff  
Supervised professional activity in selected early childhood programs, seminars. Prerequisite: 12 credit hours in early childhood education and permission of instructor. (Fall and spring)
- 238 **Clinical Practicum in Reading** (3 to 6) Horowitz  
Supervised clinical experience, including observation and participation, in testing, tutoring, and teaching. Clients may include preschoolers through adults. Minimum of 120 clinic hours required. Admission by permission of instructor. Material fee, \$25.
- 241 **Education of the Gifted and Talented** (3) Rasch  
Nature and discovery of giftedness, provision for the gifted in educational settings. Research findings and issues. (Summer)
- 245 **Secondary School Principles and Methods** (3) Mauro, Garza, Ibsen  
Classroom management and teaching techniques for initiating, guiding, and evaluating learning activities. Group work to be arranged. Prerequisite: Educ 114. Material fee, \$40. (Fall and spring)
- 246 **Teaching English in Secondary Schools** (3) Mauro  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: 24 credit hours in English. (Fall)
- 247 **Teaching Science in Secondary Schools** (3) Staff  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: 24 credit hours of science. Material fee, \$20. (Fall)
- 248 **Teaching Social Studies in Secondary Schools** (3) Staff  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: 24 credit hours of social studies. (Fall)
- 249 **Teaching Art in Secondary Schools** (3) Staff  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: 24 credit hours of art. (Fall)
- 250 **Teaching Mathematics in Secondary Schools** (3) Staff  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: mathematics through calculus. Material fee, \$20. (Fall)
- 251 **Teaching Foreign Languages** (3) Staff  
Lecture (2 hours), fieldwork (2 hours). Prerequisite: 24 semester hours of one foreign language. (Fall)
- 254 **The Middle School** (3) Staff  
Development, organization, and practices; emphasis on the learner, the teacher, the administrator, the curriculum, and the setting of the school for the pre-adolescent. (Fall)
- 273 **Pre-Service Teacher Education** (3) Staff  
Program development, governance, issues, trends. (Fall, alternate years)



- 274 In-Service Planning and Programming (3)** Staff  
The continuing professional development of educators, with focus on the design, implementation, and evaluation of in-service training programs. Material fee, \$25. (Summer)
- 287-68 Clinical Study and Treatment of Reading Problems (3-3)** Putnam  
Testing and tutoring children and adults with reading problems. A case study approach is emphasized; participants are trained to administer a diagnostic battery of tests, evaluate results, and plan and implement tutoring strategies. Prerequisite: TrEd 222 and 224. Material fee, \$25. (Academic year)
- 289 Organization and Administration of Reading Programs (3)** Horrworth  
For school administrators and reading teachers. Problems in planning, organizing, and monitoring the total reading program. (Spring)
- 290 Severe Learning Disabilities in Reading (3)** Horrworth  
The course links the fields of learning disabilities and reading, focusing on their interconnections in terms of etiology, characteristics, diagnosis, and remediation. (Fall)
- 291 Reading and Writing Across the Curriculum (3)** Putnam  
A whole-language approach to structuring classroom curriculum: strategies for developing students' reading and writing skills while studying literature, social studies, and science. (Fall and spring)
- 292 Internship: Reading (3 to 6)** Horrworth  
Limited to graduate students in reading education. Experience in a selected area of teaching or supervisory service in field-based programs. Prerequisite: permission of instructor. (Fall and spring)
- 297-98 Research and Independent Study (1 to 3)** Staff  
Individual research under the guidance of a staff member; program and conferences arranged with an instructor
- 308 Instructional Processes in Teacher Preparation and Special Education (3)** Ives  
Same as SpEd 308.
- 321 Practicum in Curriculum and Instruction (3 to 6)** Staff  
Supervised field experience in curriculum. Admission by permission of instructor. Prerequisite: TrEd 205. (Fall and spring)
- 324 Teaching Reading and Study Skills at the College Level (3)** Staff  
Evaluation of reading skills at the college level. Development of college reading programs, including diagnostic and teaching techniques, program planning and implementation. Prerequisite: TrEd 226 or equivalent, and permission of instructor. (Spring)
- 325 Curriculum Theory (3)** Staff  
Examination of reviews and research studies on curriculum theory. Focus on trends, values, interpretations, fads, design systems, and evaluation. Prerequisite: TrEd 205. (Spring)
- 345 Consultation Skills in Teacher Preparation and Special Education (3)** Ives, Shotel  
Same as SpEd 345.
- 354 Doctoral Internship: Teacher Education (6)** Staff  
Same as SpEd 354.
- 370 Interpersonal Dynamics in Teacher Preparation and Special Education (3)** Ives  
Same as SpEd 370.
- 378 Post-Master's Internship in Curriculum and Instruction (3 to 6)** Staff  
Supervised fieldwork for selected experienced teachers. (Fall and spring)
- 390 Doctoral Seminar in Curriculum and Instruction (3)** Shotel  
Review of literature in a topical area; preparation of a manuscript of publishable quality. Admission by permission of instructor. (Fall)
- 391 Dissertation Research (arr.)** Staff  
Prerequisite: TrEd 390.
- SPECIAL EDUCATION**
- 201 Overview of Special Education (3)** Staff  
Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children with special needs in a school program. (Fall)

- 220 **Selected Topics in Special Education** (arr.)  
Courses on topics relevant to special educators offered to selected groups. Star
- 221 **Accessing Community Systems for the Special-Needs Individual** (3)  
Overview of access to community systems and service delivery for individuals with special needs and their families. Material fee, \$25. (Summer) Freund
- 222 **Legislative Issues in Supportive Training, Transition, and Education Programs** (3)  
Examination, interpretation, analysis, and monitoring of legislation and policies related to the handicapped. Emphasis on practical strategies for understanding and implementing federal and state legislation and policies. Material fee, \$25 (Fall) Star
- 229 **Interpretation and Application of Academic and Vocational Assessment Information** (3)  
Specific strategies and techniques to analyze, interpret, and synthesize assessment information for the development of comprehensive academic/vocational profiles for handicapped adolescents and adults. Observation and recording procedures, report development, and postassessment conferencing are emphasized. Material fee, \$20. (Summer) Ilancone
- 230 **Vocational Assessment of Individuals Who Are Handicapped** (3 to 6)  
Investigation of the vocational assessment process, including formal and informal systems to determine vocational interests, aptitudes, and employability. Material fee, \$25. (Spring) Ilancone
- 231 **Transitional Special Education Programming** (3)  
Selected techniques and processes used in programming for the needs of handicapped individuals. Emphasis on the development of skills related to professional liaison and support roles in the design of instructional arrangements and cooperative training. Must be taken concurrently with SpEd 233. Material fee, \$20. (Fall) Taymen
- 232 **Dynamics of Career Intervention Techniques and Strategies for the Handicapped** (3)  
Specific intervention techniques and strategies focusing on career and vocational decision making for handicapped individuals. Emphasis on combining theoretical constructs with practical field experience. Material fee, \$25. (Fall) Star
- 233 **Curriculum in Transitional Special Education** (3)  
Theory and practice in planning, implementing, and evaluating curriculum for handicapped adolescents and adults. Emphasis on techniques for modifying curriculum and materials for individualized programming. Requires field-site curriculum implementation. Usually taken concurrently with SpEd 231. (Fall) Tavaman
- 234 **Seminar in Supportive Training, Transition, and Education Programs** (3)  
Analysis and development of professional presentation and writing skills. Material fee, \$20. (Spring) Star
- 235 **Coordination of Job Placement Programs in Special Education** (3)  
Rationale, resources, and programming strategies for the development and coordination of job placement programs for individuals who are handicapped. Star
- 236 **Introduction to Career/Vocational and Transitional Services** (3)  
Introduction to programs that provide career, vocational, and transition services to handicapped adolescents and adults. Material fee, \$25. (Spring and summer) Star
- 237 **Learning Strategies, Assessment, and Instruction for Learning Disabled Adolescents** (3 to 6)  
Aspects of the provision of effective and appropriate educational services to learning disabled adolescents. Material fee, \$25. (Spring) Freund and Star
- 240 **Developmental Process of Parenting** (3)  
The developmental process of becoming a parent and ongoing parenting. Material fee, \$20. (Fall) Star
- 242 **Neurodevelopmental Programming for Handicapped Infants and Toddlers** (3 or 6)  
Provides students with a theoretical background and practical experience to translate the neurodevelopmental model into techniques for developing and



- implementing educational programs for handicapped infants and toddlers. Prerequisite: SpEd 263 or 268 or permission of instructor. Material fee, \$30. (Spring and summer)
- 243 **Assessment of the Special-Needs Infant (3)** Freund  
Theory and current practice in the assessment of high-risk and handicapped infants. Material fee, \$30.
- 250 **Specialized Techniques and Materials: Transitional Special Education (3)** Staff  
Specialized instructional techniques and resources in secondary, postsecondary, business, and community programming for individuals who are handicapped. Emphasis on collaborative planning and programming. Material fee, \$25. (Spring)
- 253 **Special Education in Corrections: State of the Art (3)** Staff  
An introduction to the delivery of special education services within the juvenile justice and corrections systems. Presentations by theorists and practicing professionals. (Spring)
- 254 **Special Education in Corrections: Field Experiences (3)** Staff  
Site visits to local, state, and federal juvenile correction facilities and advocacy organizations, coordinated by a series of seminars tying theory to practice. Emphasis on program structure, goals, and general service delivery for handicapped individuals in correctional education. Material fee, \$20. (Summer)
- 255 **Interdisciplinary Case Management for Special Populations (3)** Staff  
Examination of programmatic implications of integrative academic, vocational, medical, and psychological service coordination and case management for special-needs populations. Emphasis on interdisciplinary team communication and coordination, decision making, planning, and follow-up for students and clients in secondary or adult settings. Material fee, \$25. (Spring)
- 256 **Curriculum-Based Methods for Individuals Who Are Handicapped (3)** Staff  
Curriculum-based design, implementation, and modification for individuals in special education settings; methodology needed to develop individualized programming. Material fee, \$25. (Summer)
- 258 **Microcomputers in Special Education (3 to 6)** Castleberry  
Overview of current microcomputer technology. Assessment of computer-assisted instruction software as it relates to training, evaluation, and employment of handicapped individuals. Optional 3 credit hour practicum in a setting employing adaptive devices and microcomputers in the service of handicapped persons. Material fee, \$40. Prerequisite: Educ 180 or equivalent.
- 260 **Developmental Assessment in Special Education (3)** Castleberry  
Development of assessment skills with academic diagnostic instruments. Study of validity, reliability, nonbiased testing, aptitude, achievement, and appropriate approaches. Material fee, \$40. (Fall)
- 281 **Practicum: Methods and Materials for Young Exceptional Children (3 or 6)** Staff  
Clinical practice in design and implementation of educational strategies and materials. Three dimensions: designing and developing teaching materials, classroom teaching, feedback and evaluation with professor. Requires eight hours a week on site. (Fall and summer)
- 282 **Formal Assessment of Young Exceptional Children (3)** Castleberry  
Weekly seminar designed to prepare early childhood special educators to translate formal assessment data into instructional programming. Requires fieldwork with children. Material fee, \$25. (Fall)
- 263 **Development of the Infant with Special Needs (3)** Staff  
The processes of normal infant development and interrelationships among areas of development, relationship of these processes to the growth and development of the at-risk child. Material fee, \$25. (Summer)
- 264 **Educational Implications of Medical and Genetic Conditions of the Developmentally Delayed Child (3)** Freund  
Specialized programs, techniques, and methods for teaching developmentally delayed children, with emphasis on genetically linked handicapping conditions. Practitioner needs and programming concerns are stressed. Material fee, \$25. (Spring)

- 265 Clinical Experience With Multiply Handicapped and Developmentally Disabled Young Children (3)**  
Field experience and accompanying seminar for students with limited experience in early childhood special education. Intensive involvement in an early childhood special education setting. (Summer) Freund
- 266 The Development of Language in Exceptional Children (3)**  
Introduction to the study of language acquisition and the development of language programs. (Fall) Staff
- 268 Development of Young Exceptional Children: General Etiology of Handicapping Conditions (3)**  
An in-depth examination of the development of young exceptional children and the specific nature of handicapping conditions. Lecture and field visits. Material fee, \$25. (Fall) Freund
- 269 Etiology, Symptomatology, and Approaches to Intervention With Special-Needs Children (3)**  
Typical and atypical development of special-needs children. Etiology and symptomatology of handicapping conditions. Extensive field observations. Material fee, \$25. (Spring) Freund and Staff
- 270 Mainstreaming: Adapting Attitudes, Programs, and Curriculum for Special-Needs Students (3)**  
Meeting the needs of the special-needs student in the regular classroom. Material fee, \$20. (Spring and summer) Belknap, Ives, Castleberry, Freund
- 271 Interdisciplinary Approach to Planning for the Special-Needs Child (3 or 6)**  
Interdisciplinary team functioning and case management using a systems approach. Staff
- 273 Pre-Service Planning and Programming (3)**  
Program development, governance, issues, trends. (Fall, alternate years) Staff
- 274 In-Service Planning and Programming (3)**  
The continuing professional development of educators, with focus on the design, implementation, and evaluation of in-service training programs. Material fee, \$25. (Summer) Staff
- 275 The Limited-English-Proficient Special-Needs Child: Policy, Research, and Trends (3)**  
Issues regarding educational service delivery for the LEP special-needs child. National, state, and local policies; current research in bilingual education, special education, and bilingual special education. Appropriate assessment techniques, accessing community resources, and characteristics and needs of language-minority students and their families. Material fee, \$25. Marz
- 276 Academic and Psychosocial Assessment of the Limited-English-Proficient Special-Needs Child (3)**  
Issues and implications of second-language learning, the relationship between learning disabilities and problems related to adaptation to a different culture. Students review and evaluate formal and nonformal assessment measures and administer bilingual assessment materials. Marz
- 277 Teaching the Limited-English-Proficient Student: Methods and Materials (3)**  
Commonly used tests, formal and informal assessment strategies and procedures, interventions, and curricular and classroom management strategies for use with bilingual students who are handicapped or have special needs. Instructional adaptations designed to meet cultural, linguistic, and academic needs in both mainstream and special classes. Material fee, \$25. Marz
- 278 Internship: Educational Intervention for the Limited-English-Proficient Special-Needs Child (3 to 6)**  
Supervised internship. Students learn to write culturally relevant IEP programs, conduct effective parent interviews, and relate assessment findings to productive programming. Staff
- 280 Developmental Assessment of Adolescents (3)**  
Formal and informal psychoeducational assessment, assessment instruments commonly used with upper-elementary and junior and senior high school students, the writing of psychoeducational reports. Material fee, \$25. (Spring) Staff



- 285 Facilitating Essential Systems for the Seriously Emotionally Disturbed Student (3)** Ives  
The various systems (home, school, interagency, community) that have an effect on the life of a seriously emotionally disturbed student. Skills necessary to help enable these systems to function in the service of seriously emotionally disturbed students.
- 287 Interdisciplinary Topics Related to the Seriously Emotionally Disturbed Adolescent (3)** Belknap, Ives  
Topics may include aspects of psychopharmacology, abuse, suicide, and the addictive process. Recent research and treatment advances. (Summer)
- 288 Characteristics of the Seriously Emotionally Disturbed Student: Infancy Through Adolescence (3)** Belknap  
An in-depth examination of psychiatric diagnostic categories, psychosocial development issues, and the nature and needs of the seriously disturbed student. Material fee, \$20. (Fall)
- 289 Curriculum and Instructional Strategies for the Seriously Emotionally Disturbed Adolescent (3 to 6)** Ives  
Design, adaptation, and implementation of instructional methods and materials. Material fee, \$20. (Fall)
- 290 Affective Development and Behavior Management in Special Education (3)** Castleberry, Freund  
Theory, programming, and behavior management strategies from theoretical and practical points of view. Material fee, \$25. (Spring)
- 291 Behavior Management Practicum: The Seriously Emotionally Disturbed Adolescent (3)** Ives  
Field-based examination of theory of and techniques for classroom control. Causes of behavior. Material fee, \$25. (Summer)
- 292 Professional Internship in the Education of Young Exceptional Children (6 or 9)** Castleberry  
Supervised internship in the education of young exceptional children. A minimum of 420 clock hours required. (Spring and summer)
- 293 Professional Internship for the Special Educator (3 to 9)** Freund, Castleberry  
Supervised internship in early intervention. (Spring and summer)
- 294 Professional Internship: Service to the Seriously Emotionally Disturbed Adolescent (6 to 9)** Ives, Belknap  
Full-time placement as a psychoeducator in various sites. (Spring)
- 295 Professional Internship in Supportive Training, Transition, and Education Programs (1 to 9)** Ianacone  
Supervised internship focused on providing supportive training, transition, and education experiences for handicapped individuals. Emphasis on diversified cooperative and interagency programming. 140-420 clock hours required (Fall, spring, and summer)
- 296 Philosophical, Legal, and Practical Issues of Service Delivery for the Special-Needs Child (3)** Shotel  
Historical and legal perspectives that have had an effect on service delivery systems for the special-needs child. Consequences of legislation on systems of service delivery in the public school. The impact on the regular classroom teacher and the administrator. (Summer)
- 297-98 Research and Independent Study (1 to 3)** Staff  
Individual study or research under guidance of staff member. Admission by permission of advisor. May be repeated for credit
- 301 Research Seminar in Special Education (arr)** Staff  
Participation in a small group with a selected faculty member; research on and discussion of an area of common interest. Admission by permission of instructor. (Spring)
- 303 Administration and Supervision of Special Education (3)** Ives, Castleberry  
Philosophy and nature of special education, program organization, administration, and development. Surveying local needs, program evaluation and supervision. Admission by permission of instructor. Material fee, \$25. (Summer)

- 304 **Recent Research and Trends in Special Education** (3) Ianacone, Fred  
Emphasis on topical research issues, problems of conducting research, and procedures and sources for obtaining research funding. Material fee, \$25. (Fall and spring)
- 306 **Dynamics of Family Intervention: Theory and Practice in Special Education** (3) Ives, Prudence  
Theoretical foundations and clinical techniques necessary for the special educator to counsel parents of handicapped students. Material fee, \$25. (Spring)
- 308 **Instructional Processes in Teacher Preparation and Special Education** (3)  
Philosophical and methodological aspects of staff development and university programs; opportunities for practice in needs assessment, program design, and instruction. Admission by permission of instructor. Material fee, \$20 (Spring)
- 343 **Psychoeducational Diagnosis in Special Education** (3) Belknap, Alice  
The range of diagnostic strategies applicable to the student who presents psychological and related learning difficulties. Admission by permission of instructor. Material fee, \$25. (Spring)
- 345 **Consultation Skills in Teacher Preparation and Special Education** (3) Ives, Prudence  
Consultation models from organizational development, organizational psychology, and mental health applied to in-service training for educational personnel and programs for the special student in the public schools. Material fee, \$20 (Spring and summer)
- 351 **Developing Home/School/Community Support Systems** (3) Belknap, Alice  
Provides experiences that facilitate effective home-school-community support for the emotionally disturbed adolescent. Review of literature on dysfunctional family systems. (Spring)
- 352 **Seminar: Legal Issues and Public Policy Concerns for Individuals Who Are Handicapped** (3)  
Identification and examination of policy issues; procedures involved in moving an area of concern into the political and legislative process; the role of agencies and advocacy groups in defining and shaping regulatory and implementation criteria into a legal mandate. Material fee, \$25 (Summer)
- 353 **Post-Master's Internship in Special Education** (3 to 6) Starr  
Supervised professional internship in college teaching, administration, supervision, research or policy-making. Internships are individually arranged. Admission by permission of instructor. (Fall and spring)
- 354 **Doctoral Internship: Special Education** (3 to 6) Starr  
Supervised professional internship in college teaching, administration, supervision, research, policy-making, or private agency function. Each internship individually arranged. Admission by permission of advisor. (Fall and spring)
- 360 **Interdisciplinary Techniques in the Diagnostic Process in Special Education** (3) Starr  
Application of theoretical concepts of assessment; development of assessment programs; interpretation and application of interdisciplinary diagnostic evaluations. Prerequisite: SpEd 260 or equivalent, and permission of instructor. Material fee, \$25. (Fall)
- 370 **Interpersonal Dynamics in Teacher Preparation and Special Education** (3) Starr  
Attitude change and the access process. Applies specific psychosocial constructs germane to successful interaction to the milieu of the consultant administrator. Material fee, \$25 (Fall)
- 390 **Doctoral Seminar in Special Education** (3) Starr  
Review of literature in a topical area, preparation of a manuscript of publication quality. Admission by permission of instructor. (Fall)
- 391 **Dissertation Research** (arr.) Starr  
Prerequisite: SpEd 390.



## TELECOMMUNICATION

Professors C.H. Sterling (Director), G. Brock (Visiting)  
 Professorial Lecturers J.C. Baker, R.M. Finn, H. Geller, R.J. Oslund  
 Associate Professorial Lecturers R.M. Frieden, L.M. Gallagher

The Graduate School of Arts and Sciences, in cooperation with the School of Business and Public Management and the School of Engineering and Applied Science, offers a multidisciplinary program leading to the degree of Master of Arts in the field of telecommunication. The program focuses on the interaction among technology, economics, management, and both corporate and governmental policy-making in the common carrier and media industries.

Master of Arts in the field of telecommunication—Prerequisite: a bachelor's degree with a B average from an accredited college or university

Required: the general requirements stated under the Graduate School of Arts and Sciences, including at least 36 credit hours of course work. Required courses for the degree include Econ 217 and 249, EE 450 and 451, TCom 201, 240, 241, 259, and four electives selected with a faculty advisor, typically TCom 220, 224, EE 452 and Mgt 282. Each student must pass a Master's Comprehensive Examination. A thesis option is available.

Telecommunications management is available as an elective field for the Master of Public Administration program in the School of Business and Public Management; telecommunications and computers is available as an area of concentration within the Master of Science program in the School of Engineering and Applied Science.

201 **Development of the Telecommunication Industry** (3)

Development of telecommunication technology, industry, and policy in the United States, stressing interrelationships among industry, government bodies and policies, and users.

220 **Technology and Telecommunication Policy** (3)

National and international policy issues that arise from the interaction between scientific and technological development in the telecommunication industry and government policies. Prerequisite: TCom 201

224 **Telecommunication Regulation** (3)

Background, current status, and trends in regulation of common carriers and electronic media. Legislative, FCC, and judicial decisions and trends. Emphasis on the process of federal regulation, with case studies. Prerequisite: TCom 201.

240 **Seminar in Domestic Telecommunication Policy** (3)

Interaction of private and public policy in telecommunication, research and development, market entry, competition, ownership and acquisition, regulation, business decisions, and social impact. The course is intended for degree candidates in their final year of study in the telecommunication program.

241 **Seminar in International Telecommunication Policy** (3)

Role and process of U.S. and international telecommunication organizations, system authorization and utilization, transborder data flow and New World Information Order, barriers to trade in information equipment and services, regional facilities planning process, and development of competition. For degree candidates in their final year of study in the telecommunication program.

259 **Applications of Economics in Telecommunication** (3)

Structure, interrelationship, and function of the telecommunication industry within a changing regulatory framework. Prerequisite: Econ 249

297 **Special Topics in Telecommunication** (3)

Special topics in technology, economics, operations, or policy. May be repeated for credit once provided the topic differs. Prerequisite: TCom 201 and permission of instructor.

298 **Independent Study** (1 to 3)

Prerequisite: permission of instructor

299-300 **Thesis Research** (3-3)

## THEATRE AND DANCE

Professor M.R. Withers

Associate Professors N.D. Johnson (Chair), W.A. Pucilowsky

Assistant Professors B.W. Sabelli, C.F. Gudenius

Master of Fine Arts in the field of theatre—Prerequisite: the degree of Bachelor of Arts from this University, or an equivalent degree.

Required: the general requirements stated under the Graduate School of Arts and Sciences

For the concentration in theatre design, the program of study consists of 54 credit hours of 100- and 200-level course work in theatre and dance and in art, planned in consultation with the advisor, including a creative thesis (equivalent to 6 credit hours).

For the concentration in dance, the program of study consists of 36 credit hours of 100- and 200-level course work in theatre and dance and in related arts, planned in consultation with the advisor, including a creative thesis.

For listings of 100-level courses, see the Undergraduate Programs Bulletin.

Prerequisite to all third-group courses: M.F.A. candidacy or permission of instructor.

**203 Professional Literature (3)**

Survey of the literature of dance, including print and media materials.

**207 Trends in Contemporary Performance (3)**

Study and discussion of current work in performance. Guest lectures and field study. Emphasis on individual projects.

**231 Lighting Design (3)**

Theory and execution of lighting design for theatre and dance. Prerequisite: TrDa 131. May be repeated for credit. (Spring)

**233 Theatre Architecture: Performance and Exhibit Spaces (3)**

Theatrical architecture from a historical perspective. Traditional and nontraditional exhibit, theatrical, and assembly spaces are examined and evaluated with reference to the functional use of space from practical, architectural, and aesthetic perspectives. Studio work includes design of a hypothetical performance space and its auxiliary units.

**234 Advanced Scene Design (3)**

Preparation for the advanced student designer, with emphasis on the individual development of rendering techniques, technical drafting, traditional script analysis, and original scenographic interpretations. May be repeated once for credit. (Fall, even years)

**235 Special Projects in Scene Design (3)**

Exploration of all styles of traditional and contemporary scenography through the making of scale models. May be repeated once for credit. Admission by permission of instructor. (Spring)

**236 Costume Design (3)**

Introduction to the basic techniques of costume design through specific projects. Various rendering techniques will be explored, consistent with the historical period concerned. Prerequisite: TrDa 136 (Spring, odd years)

**237 Advanced Costume Design (3)**

Study of special design, style, and construction problems.

**238 Pattern Making (3)**

The study of pattern drafting and draping methods, based on contemporary and historical clothing, through lecture and class work. Prerequisite: TrDa 136 (Spring, even years)

**250 Advanced Dance Technique (2)**

Advanced study in selected styles: ballet, modern, Spanish. May be repeated for credit.

**252 Advanced Dance Composition (3)**

Elements of dance composition explored through improvisation, short movement studies, and dances that are presented, discussed, and reworked. May be repeated for credit.

**255 Choreographic Projects (1 to 3)**

Original dances are created or dances are reconstructed for performance under the guidance of dance faculty. May be repeated for credit.



- 280 Special Studies in Dance Video (3)** Withers  
Review of existing art works of dance/video and dance/film for content and television production techniques. Emphasis on projects in-studio and with VHS and professional equipment. Lecture and laboratory.
- 270 Aesthetics and Criticism (3)** Johnson  
Examination of aesthetic theories of dance as a performing art, with application to criticism.
- 290 Workshop (1 to 3)** Staff  
Workshops with emphasis on contemporary issues and problems. Development of advanced professional competencies. Experts in short intensive periods. May be repeated for credit.
- 291 Internship (3 or 6)** Staff  
Internships with dance and theatre companies or arts organizations, including conference and/or seminar. May be taken for a total of 6 credit hours.
- 292 Selected Topics in Theatre and Dance (1 to 3)** Staff  
May be repeated for credit.
- 294 Independent Research in Theatre and Dance (arr.)** Staff  
May be repeated for credit.
- 299-300 Thesis Research (3-3)** Staff

### TRAVEL AND TOURISM

See Human Kinetics and Leisure Studies.

### UNIVERSITY PROFESSORS

University Professors: A. Etzioni, P.J. Caws, S.H. Nasr

Courses numbered in the 770s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program concerned, appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the Schedule of Classes under the 700 series. Following is a list of courses that are expected to be taught fairly regularly by University Professors.

- Phil 772 Individualism (3)** Caws  
The concept of the free individual in philosophy, psychology, literature, and politics; individuals and groups; individualism and collectivism; exemplary individuals in biography, autobiography, and fiction; problems of individual and collective agency and identity. For undergraduates, open to graduate students.
- Phil 774 Understanding Technology (3)** Caws  
The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates, open to graduate students.
- Phil 776 Peace Studies and Conflict Resolution (3)** Caws  
The scope and complexity of conceptual and practical issues arising from the problem of war and peace. The main intellectual positions that have been taken and the major works to which they have given rise. For undergraduates; open to graduate students.
- Phil 778 Left and Right in Philosophy and Politics (3)** Caws  
A fundamental inquiry into the concept of the state in terms of entrenched oppositions: individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For undergraduates, open to graduate students.

## Phil

779 **Philosophy and Psychoanalysis (3)**

An exploration of some striking parallels between the topics addressed in Freud's psychoanalytic theories on the one hand and the traditional context of philosophical reflection on the other, with special emphasis on the relationship between cognitive theory and therapeutic practice (in both disciplines). For undergraduates; open to graduate students.

## Rel

770 **Islamic Civilization and the West (3)**

The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; the impact of the image of Islam as shown in modern Western scholarship upon the Islamic world. For juniors and seniors, open to graduate students.

## Rel

771 **Persian Sufi Literature in East and West (3)**

The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact in the West and in India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students.

## Rel

772 **Mysticism—East and West (3)**

A thematic examination of major elements and components of mystical traditions, dealing with such issues as the nature of mysticism, the search for ultimate reality, the mystical significance of the cosmos, the mystical science of the sacred, and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam.

## Rel

773 **Perennial Philosophy (3)**

The idea of perennial philosophy as developed in the 20th century by A. Huxley, A.C. Coomaraswamy, and certain Neo-Thomists. Doctrines and teachings of perennial philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.

## Rel

775 **Man and the Natural Environment (3)**

The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment.

## Rel

777 **Religion and Science (3)**

The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period in question. For juniors and seniors; open to graduate students.

## Soc

776 **Public Policy Research (3)**

Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience.

## Soc/Econ/PSc

779 **The Elements of Socioeconomics (3)**

A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students, open to qualified undergraduates.



## URBAN PLANNING AND REAL ESTATE DEVELOPMENT

Professors D.C. McGrath, Jr., S.S. Fuller (Chair), S. Greene, D.E. Gale  
 Associate Professor R.W. Longstreth  
 Assistant Professor C.A. Parsons (Visiting)

See the School of Business and Public Management for the program of study leading to the degree of Master of Urban and Regional Planning, which provides preparation for professional practice in the planning field, and areas of specialization in planning as components of programs leading to the degrees of Master of Public Administration and Doctor of Philosophy

- 201 Planning Theory and Practice I (3)** Parsons  
 Introduction to the development of urbanization and urban settlements in the United States, the emergence and growth of urban and regional planning, and the evolution of issues in the practice of the planning profession. (Fall)
- 202 Planning Theory and Practice II (3)** Parsons  
 Introduction to the concepts of planning, plan making, and plan implementation. Examination of the relationship between theory and practice in planning. Discussion of the role of reconnaissance studies, goal formulation, technological forecasting, and scenario development in planning practice. Prerequisite: UPRE 201 or permission of instructor. (Spring)
- 203 Principles of Community Planning and Design (6)** Greene  
 Planning and design studio to develop and apply planning methods and graphic techniques; principles of land use and community design; analysis of factors affecting community development and change. Open only to candidates for the degree of Master of Urban and Regional Planning. Laboratory fee, \$20. Prerequisite: UPRE 201 or permission of instructor. (Fall)
- 207 Land Development Planning (3)** McGrath  
 Selected problems in urban and regional planning; applications of zoning, environmental controls, tax incentives, and other techniques available for the implementation of development plans. Prerequisite: UPRE 201 or permission of instructor. (Spring)
- 208 Land Use and Urban Transportation Planning (3)** McGrath  
 Relationships between land use and the movement of goods and people. Examination of land use and transportation planning principles, issues, and techniques. Roles of public and private interests in land use and transportation planning and management. Prerequisite: UPRE 201 or permission of instructor. (Fall)
- 210 Urban Development Economics (3)** Fuller  
 Economic forces affecting urban growth and change; relationships among cities, metropolitan areas, and regions in the context of the national economy; socioeconomic implications of urban land development policies; basic studies and methods of economic analysis. Prerequisite: Econ 217 or 218 or equivalent or permission of instructor. (Fall)
- 211 Methods of Urban and Regional Analysis I (3)** Preston  
 Study of basic statistical procedures and their interpretations, introduction to research methods and data collection and management, microcomputer operations, survey sampling and questionnaire design, and statistical problem solutions. This course establishes a computer capability that the student utilizes subsequently in all course assignments. (Fall)
- 212 Methods of Urban and Regional Analysis II (3)** Fuller  
 Introduction to methods used to analyze, estimate, and forecast population, employment, income, and economic growth and development. Includes cohort survival, location quotients, shift-share, market analysis, and case study methods. Prerequisite: UPRE 211. (Spring)
- 215 Advanced Planning Problems (6)** McGrath  
 Investigation of complex problems of the metropolitan region; analysis of findings, formulation of proposals, and presentation of material to faculty and cooperating groups. Multidisciplinary team and individual planning projects. Studio course. Laboratory fee, \$20. Prerequisite: UPRE 203 or permission of instructor. (Fall)

- 218 Metropolitan and Regional Planning (3)**  
Multidisciplinary study of the methods of regional analysis and process of regional planning; development of projects of regional scale requiring problem analysis, synthesis, and plan formulation. Prerequisite: UPRE 201 or permission of instructor. (Spring) Fuller
- 225 Economic, Social, and Legal Aspects of Real Estate Development (3)**  
Same as Fina 225. Examination of the forces that shape urban development; introduction to market analysis methods and techniques to evaluate project feasibility; study of the institutional and legal framework within which urban development occurs and that influences controls, land value, and development potential. Prerequisite: Permission of instructor. (Fall) Fuller
- 226 Financing Real Estate Development (3)**  
Same as Fina 226. Principles of development finance; evaluating and measuring the investment attractiveness of real estate projects; obtaining, differentiating, and hedging sources of real estate funding; and appraising property. Incentives provided by local, state, and federal governments. Prerequisite: UPRE 225 or permission of instructor. (Fall and spring) Staff
- 227 Problems in Real Estate Development (3)**  
Same as Fina 227. Applications of market analysis, valuation, and financial techniques to the development process. Prerequisite: UPRE 225, 226; must be taken concurrently with UPRE 228. (Spring) Staff
- 228 Real Estate Development Planning and Design (3)**  
Same as Fina 228. Application of planning design principles and techniques to development proposal project in a studio/laboratory environment. Field reconnaissance and graphic techniques applied to concept formulation and site selection, analysis, and planning in an urban context. Must be taken concurrently with UPRE 227. (Spring) Greene
- 242 Urban and Rural Development Policies (3)**  
(Formerly International Urban Planning)  
Same as Econ 233. Carroll
- 251 Community Planning and Housing (3)**  
Basic theories, concepts, principles, and analytical methods, including housing supply and demand conditions, market analysis, community facility planning, and impact analysis, commercial revitalization, and neighborhood dynamics. Prerequisite: UPRE 201 or permission of instructor. (Fall) Staff
- 255 Urban Housing (3)**  
Principal issues affecting the demand for and supply of housing, including housing financing, housing costs, tenure options, rehabilitation and conservation, market dynamics and requirements, and public-sector involvement. Prerequisite: UPRE 251 or permission of instructor. (Spring) Fuller
- 257 Financing State and Local Governments (3)**  
Same as PAD 248. Lee
- 258 Advanced Urban Development Economics (3)**  
Analysis of case studies of large-scale development projects to gain comprehension of financial, political, legal, and technical complexities and constraints inherent in the urban development process. Prerequisite: UPRE 210 or permission of instructor. (Fall) Staff
- 261 Community Planning and Design (3)**  
Investigation of perceptual, social, physical, and aesthetic factors in planning and design. Emphasis on interaction of users and the environment, principles and process of community design, visual analysis, evaluation and implementation techniques. Prerequisite: UPRE 203 or permission of instructor. (Fall) Greene
- 262 Community Planning and Design Studio (6)**  
Planning and design studio; application of community design principles and process to typical problems of community change and development. Laboratory fee, \$20. Prerequisite: UPRE 261 or permission of instructor. (Spring) Greene
- 263 Community Planning Projects (3)**  
Application of the techniques and methods of historic preservation, urban planning, housing and community development, community design, and other disciplines to problems of revitalizing urban areas. Surveys, inventories, analysis, formulation of proposals, and presentation to faculty and cooperating groups. Laboratory fee, \$20. Prerequisite: UPRE 201 or permission of instructor. (Summer) Greene



- 275 The Politics of Historic Preservation (3)** Staff  
Same as AmCv 275. Overview of the political issues, forces, events, and players that have shaped contemporary preservation practice, with an emphasis on public policy issues that have not been resolved and continue to confront preservation objectives. Prerequisite: Permission of instructor (Spring)
- 276 Economics of Preservation (3)** Staff  
Same as AmCv 276. Analysis of economic techniques and benefits used to encourage the retention and reuse of historic buildings and districts in the United States. Emphasis on revitalization of older commercial centers and the Main-street program. Prerequisite: Permission of instructor (Spring)
- 277-78 Historic Preservation: Principles and Methods (3-3)** Longstreth  
Same as AmCv 277-78.
- 280 Community Service Project (3)** Staff  
An individual or group project involving urban planning services to a community group, public agency, or nonprofit organization. The project incorporates techniques and knowledge acquired during the student's program of study, enabling application to a specific situation that simultaneously represents a valid professional learning experience and public service. (Fall and spring)
- 290 Special Topics (3)** Staff  
Experimental offering: new course topics and teaching methods. May be repeated once for credit. (Fall or spring)
- 295 Research Methods (3)** Staff  
Directed research and investigation of special problems in community development. May be repeated once for credit (Fall and spring)
- 298 Directed Readings and Research (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311
- 398 Advanced Reading and Research (arr)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit
- 399 Dissertation Research (arr)** Staff  
Limited to doctoral candidates. May be repeated for credit

## WOMEN'S STUDIES

Professor P.H.M. Longermann (Director)  
 Professorial Lecturer S. Ridder  
 Associate Professor P.M. Palmer  
 Adjunct Associate Professors J.N. Brantley, R. Spalter-Roth  
 Assistant Professorial Lecturer M.B. Pratt

**Committee on Women's Studies**  
 L. Brandt, J.N. Brantley, M.M. Cassidy, C. Dietch, P.H.M. Longermann, K. Oliver, P.M. Palmer, S. Quitslund, A. Rommes, G. Savage, R. Spalter-Roth

The Graduate School of Arts and Sciences offers two interdisciplinary programs leading to the degrees of Master of Arts in the field of women's studies and Master of Arts in the field of public policy with a concentration in women's studies. Both are directed by the Committee on Women's Studies and draw upon faculty from various departments within the University and resource persons in the community.

The women's studies programs seek to examine and integrate the contributions of established academic disciplines to an understanding of the historical and contemporary role and status of women, and to provide training necessary to evaluate and formulate public policy for women. Each student will work closely with an advisor in designing a program to meet individual research interests and professional goals. Prospective degree candidates should consult with the director of the Women's Studies Program.

Master of Arts in the field of women's studies and Master of Arts in the field of public policy with a concentration in women's studies—Prerequisite: a bachelor's degree from an accredited college or university. Students are expected to have completed the prerequisites for graduate courses.

Required: the general requirements stated under the Graduate School of Arts and Sciences, and 36 credit hours of course work, with or without a thesis. All students must

take a common core of women's studies courses. WStu 220, 221, 225, and a final 6 hours, either WStu 283 and 295 or WStu 299-300. Policy-oriented students must take four of the six courses in the public policy core (Stat 104, 183, PSc 203, Psyc 244, PPol 211, Econ 217) with Stat 104, 183, PSc 203, and Econ 217 recommended. WStu 240 may be substituted for one of the core policy courses. Of the remaining three courses, two must be in the same discipline, which may be in the humanities, social sciences, or public administration. Those pursuing the Master of Arts in the field of women's studies must take, in addition to the core courses in women's studies, 12 credit hours in one other discipline (history, literature, economics, philosophy, or sociology) and 9 hours of electives. With permission, other disciplinary concentrations may be selected. All candidates are required to pass a Master's Comprehensive Examination.

#### 220 Perspectives on Women (3)

Survey of the historical development of feminist theory in Europe and the United States from the 1790s to the 1940s, focusing especially on feminist uses of and responses to enlightenment liberalism, social Darwinism and other biologically based social theories, Marxism, Freudianism, and existentialism. Theories are examined in the context of women's movements for social justice. (Fall) Palmer

#### 221 Research Issues in Women's Studies (3)

Analysis of the contribution of feminist or gender-relations perspectives from humanities and social science disciplines to the issues and methods of social research and social policy and practice. Topics include a review of feminist frameworks, a critique and re-evaluation of traditional academic disciplines and analysis of current research on and for women. (Fall) Spalter-Roth

#### 225 Feminist Theory (3)

Developments in feminist theory in the past 20 years, with a primary focus on American feminism and some consideration of European and Third World thought. (Spring) Lengermann, Palmer

#### 240 Women and Public Policy (3)

Basic steps in systematic policy analysis and comparison of genderless analyses with those based on gender. Application of analyses to specific U.S. policy issues, such as domestic violence, military service, abortion rights, equal employment opportunity, child and dependent care, welfare, social security and international development assistance. (Spring) Palmer, Spalter-Roth

#### 241 Women and the Law (3)

Legal status of women. Emphasis on marital status, employment, media, education, health services, crime, and the Constitution. (Spring) Ridder

#### 251 Women, Literature, and the Arts (3)

Same as Engl 251. Examination of stereotypes, themes, language, patterns, and symbolism in works by and about women. Particular attention to the woman as artist and the development of feminist criticism. (Fall) Romines, Tate

#### 260 Women and Work in the United States (3)

Theoretical approaches, from the perspectives of several disciplines, to explanations of the movement of women between paid employment in the labor force and unpaid employment outside the labor force since 1945. The persistence of job-related gender and racial discrimination and of income differentials by gender. Prerequisite: Econ 11-12 or 217. Same as AmCv 260 and Econ 141. (Fall) Haber, Palmer

#### 270 Seminar: Selected Topics (3)

Investigation of a current policy issue of particular concern to women, or consideration of women's status in a particular social system. (Fall and spring) Staff

#### 280 Independent Study (3)

May be repeated for credit. Arrangements must be made with sponsoring faculty member prior to registration. (Fall and spring) Staff

#### 283-84 Practicum in Women's Studies (3)

Study of the changing status of women through supervised assignment to public and private agencies engaged in policy-making, education, political action, and research. Placement arrangements begin the semester prior to registration for this course. (Fall and spring) Staff

#### 295 Independent Research in Women's Studies (arr.)

Individual library or field research. Program advisor's approval of a written proposal required. (Fall and spring) Staff

#### 299-300 Thesis Research (3-3)



## FACULTY AND STAFF OF INSTRUCTION 1990-1991

### Graduate School of Arts and Sciences

### School of Engineering and Applied Science

### School of Education and Human Development

### School of Business and Public Management

### Elliott School of International Affairs

- Andreas Andrew Abraham, Associate Professor of Pathology  
M.D. 1953, University of Szeged, Hungary
- Fred Paul Abramson, Professor of Pharmacology  
B.A. 1962, Case Western Reserve University; Ph.D. 1965, Ohio State University
- Eugene Abravanel, Professor of Psychology  
B.A. 1955, University of Michigan; M.A. 1960, Swarthmore College; Ph.D. 1965, University of California, Berkeley
- Achilles Grammenos Adamantiades, Adjunct Professor of Engineering  
Diploma 1957, National Polytechnic, Greece; Ph.D. 1966, Massachusetts Institute of Technology
- William Clayton Adams, Professor of Public Administration  
B.A. 1971, M.A. 1972, Baylor University; Ph.D. 1977, George Washington University
- Sankar L. Adhya, Adjunct Professor of Genetics  
B.S. 1958, M.S. 1960, Ph.D. 1963, University of Calcutta, India; Ph.D. 1967, University of Wisconsin
- Joseph Morris Aein, Adjunct Professor of Engineering  
B.S. 1958, Massachusetts Institute of Technology; M.S.E.E. 1958, Ph.D. 1962, Purdue University
- Lewis Francis Affronti, Professor of Microbiology and Immunology  
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University
- Hugh Lecaine Agnew, Assistant Professor of History and International Affairs  
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- Mohamed Abd El-Aziz Ahmed, Assistant Professorial Lecturer in Engineering  
B.S. 1976, Diploma 1980, Helwan University, Egypt; M.S. 1983, D.Sc. 1988, George Washington University
- Yoshio Akiyama, Professorial Lecturer in Mathematics  
M.A. 1963, Andrews University; Ph.D. 1967, University of Minnesota
- Ali A. Alani, Assistant Research Professor of Biological Sciences  
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- John D. Albertson, Adjunct Assistant Professor of Music  
B.M. 1981, Catholic University of America
- Julia W. Albright, Professor of Microbiology and Immunology  
B.S. 1982, East Tennessee State University; M.S. 1972, University of Akron; Ph.D. 1978, Indiana State University
- Marshall W. Alcorn, Jr., Assistant Professor of English  
B.A. 1970, Texas Lutheran College; M.A. 1976, Vanderbilt University; Ph.D. 1981, University of Texas
- Charles Alexander, Jr., Adjunct Professor of Engineering  
B.S. 1962, Lowell Technological Institute; M.S. 1965, University of New Hampshire; Ph.D. 1973, University of Maryland
- Yonah Alexander, Research Professor of International Affairs  
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- Nikitas Anestis Alexandridis, Professor of Engineering and Applied Science  
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**Julius Axelrod, Distinguished Professor of Science; Professorial Lecturer in Pharmacology**

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- James D. Baker, *Professorial Lecturer in Administrative Sciences*  
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- John C. Baker, *Professorial Lecturer in Telecommunication*  
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- Stanley M. Barkin, *Associate Professorial Lecturer in Chemistry*  
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- Richard Walker Barnwell, *Professorial Lecturer in Engineering*  
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- Brenda C. Barthell, *Lecturer in Art Therapy*  
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- Wayne Anthony Baughman, *Studio Instructor in Trumpet*  
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- Kenneth Louis Becker, *Professor of Medicine and of Physiology*  
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- Otto Bergmann, Professor of Physics**  
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- Simon Y. Berkovich, Professor of Engineering and Applied Science**  
M.S. 1960, Moscow Physical-Technical Institute, U.S.S.R.; Ph.D. 1964, Institute of Precise Mechanics and Computer Technology, U.S.S.R.
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- Barry Louis Berman, Professor of Physics**  
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- Jerald Jack Bernstein, Research Professor of Neurological Surgery and of Physiology**  
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- Neil Z. Bien, Assistant Clinical Professor of Psychology**  
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- William Thomas Bisignani, Professorial Lecturer in Engineering**  
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- Hiranmay Biswas, Assistant Professorial Lecturer in Engineering**  
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- David Bjelajac, Assistant Professor of Art**  
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- Karen A. Bladergroen, Clinical Instructor in Art Therapy**  
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- Lewis Horrigan Blakey, Professorial Lecturer in Engineering**  
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B.S. in E.E. 1964, M.S. in E.E. 1966, University of Vermont; M.E.A. 1972, George Washington University
- Elliot Blum, Associate Clinical Professor of Psychology**  
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- Jeffrey Michael Bockman, Assistant Research Professor of Microbiology and Immunology**  
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- William James Boettinger, Professorial Lecturer in Engineering**  
B.E.S. 1968, Ph.D. 1972, Johns Hopkins University
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B.S. 1948, Michigan State University; Ed.D. 1950, Georgetown University
- Ronald Carl Bohn, Associate Professor of Anatomy**  
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- Jane M. Bonbright, Assistant Professorial Lecturer in Theatre and Dance**  
B.A. 1967, Indiana University
- Joseph Edmond Bonin, Assistant Professor of Mathematics**  
B.A. 1964, Assumption College; M.A. 1966, Ph.D. 1969, Dartmouth College
- Giorgio Vittorio Borgiotti, Professor of Engineering and Applied Science**  
Eng. Dr. 1957, University of Rome, Italy
- John Borriello, Clinical Professor of Psychology**  
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- John Gordon Boswell, **Professor of Education**  
B.A. in Ed. 1953, M.A. in Ed. 1956, Ed.D. 1963, George Washington University
- Bryan L. Boulier, **Professor of Economics**  
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- George McMillan Bowles, **Adjunct Associate Professor of Philosophy**  
B.A. 1966, University of Denver, Ph.D. 1970, Stanford University
- Roland Lee Bowles, **Associate Professorial Lecturer in Engineering**  
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- Kenneth R. Bowling, **Adjunct Associate Professor of History**  
B.A. 1962, Dickinson College; M.A. 1964, Ph.D. 1968, University of Wisconsin
- Lloyd Spencer Bowling, **Professor of Speech and Hearing**  
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B.S. 1975, University of Delaware; Ph.D. 1982, University of North Carolina
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- Linda J. Brandt, **Associate Professor of Psychology**  
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- Jacob I. Bregman, **Professorial Lecturer in Engineering**  
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- Michael Keith Brett-Surman, **Assistant Professorial Lecturer in Geology**  
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- George Roy Brier, **Adjunct Associate Professor of Engineering**  
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- James Thomas Broach, **Associate Professorial Lecturer in Physics**  
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- Marie Mullaney Cassidy, Professor of Physiology**  
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- Michael Scott Castleberry, Professor of Special Education**  
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- Bayard Lacey Catron, Professor of Public Administration**  
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- Charles McKay Chambers, Professorial Lecturer in Administrative Sciences**  
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- William J. Chambliss, Professor of Sociology**  
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- Narinder S. Chauhan, Visiting Associate Professor of Engineering and Applied Science**  
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- Mike C. Chen, Associate Professorial Lecturer in Engineering**  
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- Charles Clark Cheney, Associate Professorial Lecturer in Anthropology**  
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- Stephen Reed Chitwood, Professor of Public Administration**  
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## INDEX

- Abbreviations, key to, 114
- Academic status of the university, 9
- Accountancy, 115. *see also* School of Business and Public Management
- Accreditation, 9
- Administration, officers of, 14
- Administrative sciences, 117
- Admissions, *see* college or school concerned
- Advanced standing, *see* college or school concerned
- Aeracoustics, *see* School of Engineering and Applied Science
- Aeronautics, *see* School of Engineering and Applied Science
- Alumni association, 11
- American studies, 120
- Anatomy, 123
- Anthropology, 124
- Applied mathematics, *see* Mathematics
- Applied science, 128
- Applied statistics, *see* Statistics/computer and information systems
- Art, 128
- Art therapy, 133
- Artificial intelligence and human factors, *see* School of Engineering and Applied Science
- Assistantships, 21
- Association management, 134; *see also* School of Business and Public Management
- Astronautics, *see* School of Engineering and Applied Science
- Athletics, 39
- Auditing, 31
- Automation and robotics, *see* School of Engineering and Applied Science
- Awards, 26
- Biochemistry, 135
- Biological sciences, 137
- Board of trustees, 12
- Business and Public Management, School of, 83
- Business economics and public policy, *see* School of Business and Public Management
- Calendar, 5
- Campus life, office of, 37
- Career and cooperative education center, 37
- Center for career education and workshops (CCEW), 108
- Certification curricula for teachers, 82
- Changes in program of study, 31
- Chemical toxicology, *see* Forensic sciences and Chemistry
- Chemistry, 139
- Civil, mechanical, and environmental engineering, 142; *see also* School of Engineering and Applied Science
- Clinical microbiology, *see* Microbiology and Pathology
- College, schools, and division of the university, 8
- Communications, *see* School of Engineering and Applied Science
- Computer-aided design, *see* School of Engineering and Applied Science
- Computer information and resource center, 36
- Computer-integrated design and manufacturing, *see* School of Engineering and Applied Science
- Computer science, *see* Electrical engineering and computer science; *see also* School of Engineering and Applied Science, School of Business and Public Management, Management science, and Mathematics
- Conduct, regulations concerning, 31
- Consortium of universities, 10, 29
- Construction management, *see* School of Engineering and Applied Science
- Consultants in research, 341
- Continuing Education, Division of, 107
- Continuous enrollment, 32; *see also* school concerned
- Cooperative programs, 49
- Counseling, *see* Human services; *see also* School of Education and Human Development
- Counseling center, 36
- Course numbers, explanation of, 113
- Courses of instruction, 113
- Credit, 31, 115
- Crime in commerce, *see* Forensic sciences
- Criminal justice, *see* Forensic sciences
- Dance, *see* Theatre and dance
- Dean of students, office of, 35
- Decision systems, *see* School of Business and Public Management
- Defense science, *see* School of Engineering and Applied Science
- Disabled student services, 37
- Dishonesty, academic, regulations concerning, 30
- Dismissal of students, 31, 33, 34
- Dissertation requirements, 33; *see also* school concerned
- Doctor of Medicine, combined degree programs, 44, 45
- Drama, *see* Theatre and dance



- Dropping courses, 29; *see also* college or school concerned
- East Asian languages and literatures, 158
- East Asian studies, 158
- Economics, 159
- Education and Human Development, School of, 95
- Educational leadership, 164
- Electrical engineering and computer science, 171; *see also* School of Engineering and Applied Science
- Electrophysics (electronics, fields, and waves), *see* School of Engineering and Applied Science
- Elliott School of International Affairs, 101
- Employment, student, 24, 36
- Energy, *see* School of Engineering and Applied Science
- Energy conversion, power, and transmission, *see* School of Engineering and Applied Science
- Energy systems, *see* School of Engineering and Applied Science
- Engineering and Applied Science, School of, 51
- Engineering management, 185; *see also* School of Engineering and Applied Science
- Engineering science, *see* Civil, mechanical, and environmental engineering
- English, 189
- English, test of, as a foreign language (TOEFL), *see* school concerned
- Environmental and energy management, *see* School of Engineering and Applied Science
- Environmental and resource policy, 191
- Environmental science, 192
- Equal opportunity, university policy on, 8
- Faculty and staff of instruction, 295
- Fees and financial regulations, 17
- Fellowships, 21
- Finance, 193; *see also* School of Business and Public Management
- Finance and investments, *see* School of Business and Public Management
- Financial aid, 21
- Financial encumbrance for nonpayment of fees, 19
- Fine arts, *see* Art
- Fluid mechanics and thermal sciences, *see* School of Engineering and Applied Science
- Folger Institute for Renaissance and 18th-Century Studies, 49
- Folklore, *see* American studies
- Forensic sciences, 194
- Geology, 199
- Geology, 200
- Geochemistry, *see* Chemistry and Geology
- Geography and regional science, 201
- Geology, 202
- Geotechnical engineering, *see* School of Engineering and Applied Science
- Gerontology, 205
- Grades, 41, *see also* college or school concerned
- Graduate School of Arts and Sciences, 40
- Graduation, 12; *see* Calendar for dates
- Handicapped students, *see* Disabled student services
- Health and accident insurance, 35
- Health service, student, 35
- Health services management and policy, 205; *see also* School of Business and Public Management
- Historic preservation, *see* American studies and Urban planning and real estate development
- History, 208
- Housing, 35
- Human kinetics and leisure studies, 212
- Human resource development, *see* Human services; *see also* School of Education and Human Development
- Human resources management, *see* School of Business and Public Management
- Human services, 214; *see also* School of Education and Human Development
- Inactive status, 32
- Incomplete/authorized withdrawal, 30
- Incomplete, removal of, *see* college or school concerned
- Individual graduate programs, 217
- Information management, *see* School of Engineering and Applied Science
- Information systems management, *see* School of Business and Public Management
- Information systems technology, *see* School of Business and Public Management
- Institute for Sino-Soviet Studies, 106
- Insurance, health and accident, 35
- International affairs, 217
- International Affairs, Elliott School of, 101
- International business, 219; *see also* School of Business and Public Management
- International services, 37
- Internships, 21
- Latin American studies, 220
- Leave of absence, 32; *see also* school concerned
- Legislative affairs, 221
- Libraries, 11, 33
- Loans, 23
- Logistics engineering, *see* School of Engineering and Applied Science

- Logistics, operations, and materials management, *see* School of Business and Public Management
- Management of research and development, *see* School of Engineering and Applied Science
- Management of science, technology, and innovation, *see* School of Business and Public Management
- Management science, 221
- Manufacturing management, *see* School of Engineering and Applied Science
- Manufacturing systems, *see* School of Engineering and Applied Science
- Marketing, logistics, and operations management, 228; *see also* School of Business and Public Management
- Master's comprehensive examinations, *see* school concerned
- Mathematics, 230
- Mathematical modeling in information systems, *see* School of Engineering and Applied Science
- Mathematical optimization, *see* School of Engineering and Applied Science
- Mathematical statistics, 274
- Mechanical engineering, *see* Civil, mechanical, and environmental engineering; *see also* School of Engineering and Applied Science
- Medical engineering, *see* School of Engineering and Applied Science
- Medicine and Health Sciences, School of, *see* School of Medicine and Health Sciences Bulletin
- Microbiology, 233
- Model building for transportation flows, *see* School of Engineering and Applied Science
- Multicultural student services center, 37
- Museum education, 70
- Museum studies, 235
- Museum training, *see* Anthropology and Art
- Museums and material culture, *see* American studies
- Music, 236
- National Law Center, *see* National Law Center Bulletin
- Nondegree status, 107
- Ocean and marine engineering, *see* School of Engineering and Applied Science
- Off-campus degree programs, *see* Continuing Education, Division of
- Office of campus life, 37
- Office of university students, 109
- Officers of administration, 14
- Operations research, 238; *see also* School of Engineering and Applied Science
- Organizational behavior and development, *see* School of Business and Public Management
- Pathology, 241
- Pharmacology, 242
- Philosophy, 244
- Philosophy and social policy, 244
- Physical science, *see* Chemistry
- Physics, 245
- Physiology, 247
- Political psychology, 248
- Political science, 249
- Post-admission transfer credit, 32
- Postdoctoral study, 18
- Prizes, 26
- Procurement and contracting, *see* School of Business and Public Management
- Programs, right to make changes in, 33
- Property responsibility, 34
- Psychology, 254
- Public administration, 258; *see also* School of Business and Public Management
- Public policy, 262
- Public works management, *see* School of Engineering and Applied Science
- Quantitative decision making for public policy, *see* School of Engineering and Applied Science
- Radiological sciences, 263
- Refunds, 19
- Registration, 28
- Regulations, university, 28; *see also* Fees and financial regulations, and school concerned
- Release of student information, university policy on, 33
- Religion, 264
- Religious life, 39
- Research centers and institutes, 112
- Residence requirements, *see* school concerned
- Romance languages and literatures, 265
- Rules of the university, right to change, 33
- Russian and East European studies, 265
- Scholarship requirements, 29; *see also* school concerned
- Scholarships, *see* Financial aid
- Science, technology, and public policy, 266
- Security management, *see* Forensic sciences
- Security policy studies, 267
- Senate, Faculty, 18
- Smithsonian Institution, cooperative program, 49, 122
- Sociology, 268
- Solid mechanics and materials science, *see* School of Engineering and Applied Science
- Special education, *see* Teacher preparation and special education; *see also* School of Education and Human Development
- Speech and hearing, 271



- Speech and hearing center, 36  
Speech-language pathology and audiology, *see* Speech and hearing  
Statistics/computer and information systems, 273  
Stochastic modeling, *see* School of Engineering and Applied Science  
Strategic management and public policy, 277  
Structural engineering, *see* School of Engineering and Applied Science  
Structures and dynamics, *see* School of Engineering and Applied Science  
Student employment, 24, 36  
Student government, 38  
Student health service, 35  
Student services, 35  
Summer sessions, 111; *see also* Summer Sessions Announcement  
Suspension, *see* school concerned  
Systems science, networks, and controls, *see* School of Engineering and Applied Science  
Systems theory and cybernetics, *see* School of Business and Public Management  
Taxation, *see* School of Business and Public Management  
Teacher education, *see* Teacher preparation and special education, *see also* School of Education and Human Development  
Teacher preparation and special education, 278  
Teachers, certification curricula for, 82  
Telecommunications and computers, *see* School of Engineering and Applied Science  
Telecommunications management, *see* School of Business and Public Management  
Telecommunication, 287  
Television, GW, 11  
Test of English as a foreign language (TOEFL), *see* school concerned  
Theatre and dance, 288  
Thesis requirements, 33; *see also* school concerned  
Transcripts of record, 32  
Transfer within the university, 31  
Transportation management, *see* School of Engineering and Applied Science  
Travel and tourism, *see* Human kinetics and leisure studies; *see also* School of Education and Human Development  
Tuition, 17  
University Professors' courses, 289  
University students, office of, 109  
Urban planning and real estate development, 291; *see also* School of Business and Public Management  
Veterans benefits, 25  
Washington area studies, center for, 50  
Water resources engineering, *see* School of Engineering and Applied Science  
Withdrawal, 19, 30, 31, *see also* school concerned  
Women's studies, 293  
Writing center, 36

## **DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY**

**Columbian College of Arts and Sciences:** Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), and Bachelor of Science (B.S.)

**Graduate School of Arts and Sciences:** Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Music (M.Mus.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

**School of Medicine and Health Sciences:** Associate in Science (A.S.), Bachelor of Science (B.S.), Master of Public Health (M.P.H.), and Doctor of Medicine (M.D.)

**National Law Center:** Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

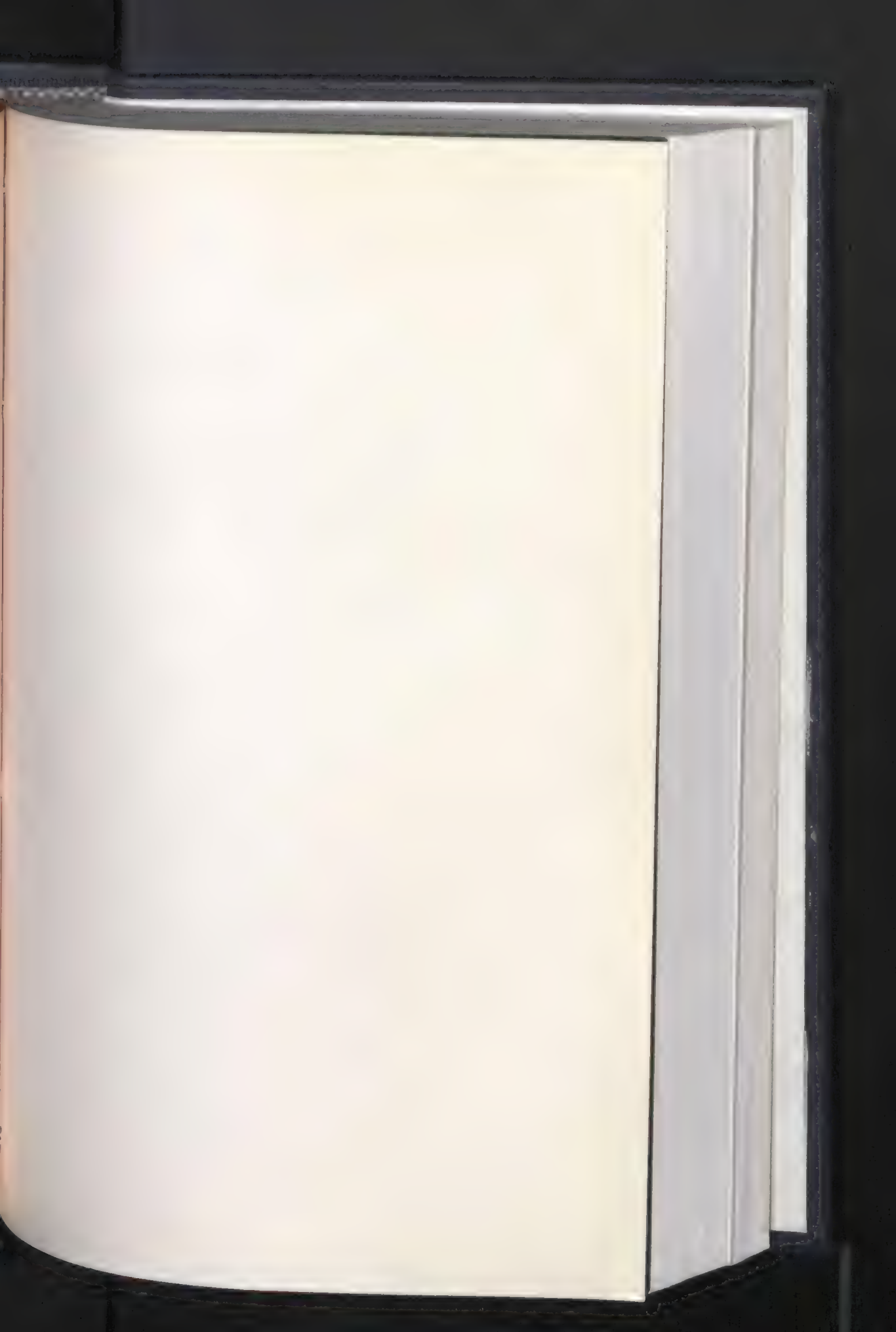
**School of Engineering and Applied Science:** Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

**School of Education and Human Development:** Bachelor of Arts in Education and Human Development (B.A. in Ed.&H.D.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

**School of Business and Public Management:** Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Master of Urban and Regional Planning (M.U.&R.P.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.).

**Elliott School of International Affairs:** Bachelor of Arts (B.A.) and Master of Arts (M.A.)





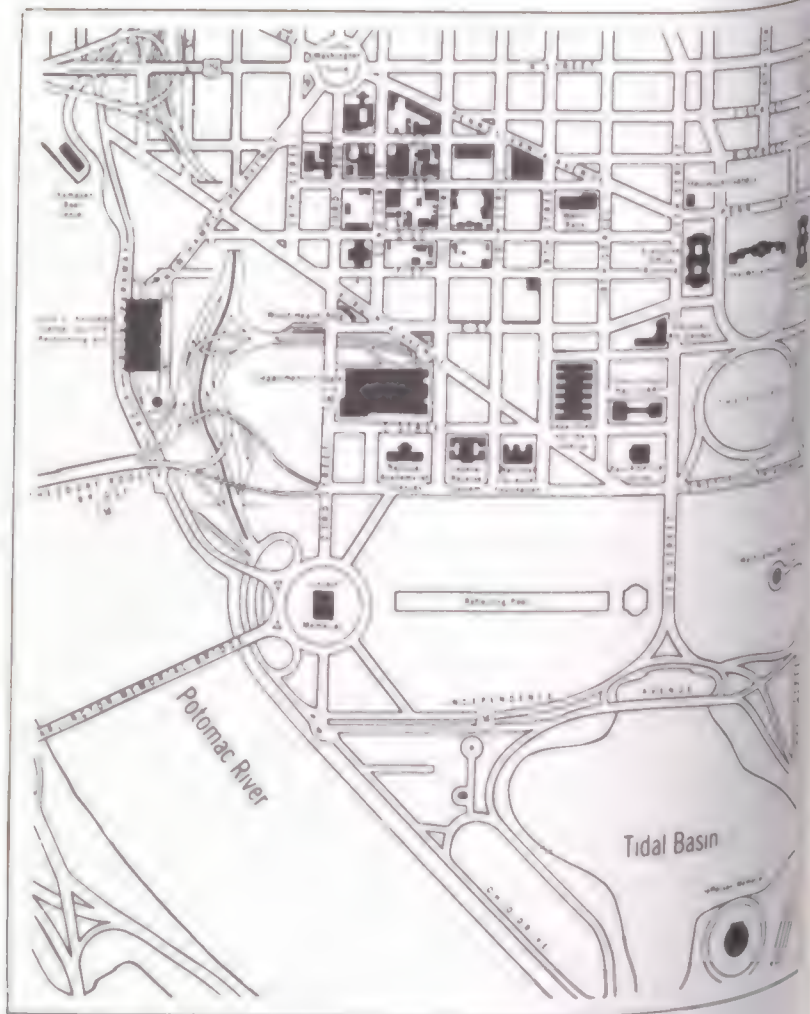
The  
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# The George Washington University

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School of Medicine and  
Health Sciences Bulletin  
1991-1992



The George Washington University Campus/Washington, D.C.

The George Washington University  
 School of Medicine and Health Sciences Bulletin  
 May 1991



# The George Washington University

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School of Medicine and  
Health Sciences Bulletin  
1991-1992

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052, telephone (202) 994-1000. For information concerning Undergraduate Programs, Graduate Programs, or the National Law Center, please request the appropriate Bulletin.

The University reserves the right to change courses, programs, and fees, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.



## Contents

5	The University
9	The School of Medicine and Health Sciences
20	The Doctor of Medicine Degree Program
38	The Master of Public Health Degree Program
44	Undergraduate Health Sciences Programs
63	Courses of Instruction
64	Anatomy
65	Anesthesiology
66	Biochemistry and Molecular Biology
67	Computer Medicine
67	Dermatology
68	Emergency Medicine
71	Health Care Sciences
80	Interdisciplinary Courses
80	Medicine
86	Microbiology and Immunology
87	Neurological Surgery
88	Neurology
88	Obstetrics and Gynecology
89	Ophthalmology
89	Orthopaedic Surgery
89	Pathology
92	Pediatrics
94	Pharmacology
96	Physiology
97	Psychiatry and Behavioral Sciences
98	Public Health
101	Radiology
105	Surgery
107	Urology
108	Faculty and Staff of Instruction
212	Index





## The University

### History and Organization

The George Washington University had its beginning in 1821 as the Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to the George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice and theory of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of the Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government. If that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character, it provided "That persons of every religious denomination shall be capable of being elected Trustees, nor shall any person, either as President, Professor, tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and one-half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located in downtown Washington for the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century, the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few miles are the White House, the Department of the Interior, the State Department, the World Bank, and many other governmental offices and international agencies. The area has many reminders of historic interest to the University. President Monroe, who signed the charter, lived at 2017 I Street. The first president of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and I Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate), the Graduate School of Arts and Sciences, the professional schools, which include the National Law Center, the Elliott School of International Affairs, and the Schools of Medicine and Health Sciences, Engineering and Applied Science, Education and Human Development, and Business and Public Management; and the Division of Continuing Education.

### Academic Status

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools. The University is on the

approved list of the American Association of University Women and is a member of the College Board. The Department of Chemistry is on the approved list of the American Chemical Society.

The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. Its Doctor of Medicine degree is recognized by all state and territorial medical licensure boards in the United States. The Master of Public Health program holds full accreditation from the Council on Education for Public Health.

### **University Policy on Equal Opportunity**

George Washington University does not discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, or veteran status. This policy covers all programs, services, policies, and procedures of the University, including admission to educational programs and employment. The University is also subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202) 994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### **The Board of Trustees of the University**

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member.

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## 8 School of Medicine and Health Sciences

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## The School of Medicine and Health Sciences

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The Office of Academic Affairs bears the responsibility for the curriculum; student affairs, including scholarship and financial aid, health sciences programs; educational evaluation; admissions; support services of the library and audiovisual facilities; and alumni affairs.

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The Office of Research is responsible for the development, administration, and support of the Medical Center research program, including laboratory research, sponsored projects, and clinical trials.

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### History

The School of Medicine and Health Sciences of the George Washington University has a distinguished history that goes back more than a century and a half. In March 1825 the School opened with the intention of building "a medical school commensurate with the progress and demands of a rising metropolis, and the improvement of service throughout the country." The School, the eleventh oldest medical school in the country, has met this responsibility by providing its students with a foundation in the medical sciences on which they have built careers in practice, teaching, research, or administration.

In 1844 the School took on a new dimension when Congress granted it the use of the Washington Infirmary. Thus, one of the earliest general teaching hospitals in the nation was established in Washington.

The distinguished history of the George Washington University School of Medicine and Health Sciences closely parallels the academic advances and medical progress of the nation. The School has contributed to both.

The George Washington University Medical Center, established in 1966, consists of Walter G. Ross Hall, which houses the School of Medicine and Health Sciences, the Paul Himmelfarb Health Sciences Library, the University Hospital, the H.B. Burns Memorial Building, which houses the Medical Faculty Associates, and the Helen I. and Mary E. Warwick Memorial Building.

In 1973, with the introduction of undergraduate programs in health sciences the name of the School was officially changed from the School of Medicine to the School of Medicine and Health Sciences.

### **Regulations**

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which they are registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If students knowingly make false statements or conceal material information on applications for admission, registration forms, or any other University documents, students' registrations may be canceled. If such falsification is discovered after students have matriculated at the University, students may be subject to dismissal from the University. Such students will be ineligible (except by special action of the faculty) for subsequent registration in the University.

### **Registration**

Attendance in class requires compliance with the School's registration deadlines.

### **University Policy on the Release of Student Information**

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance, school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

### **Right to Dismiss Students**

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes whenever, in the interest of the student or the University, the University administration deems it advisable.



### Right to Change Rules

The University and its college, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

### Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

### University Policy on Drugs

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken to protect the interests of the University and the rights of others.

### The Libraries

Students have the privilege of using the University's Gelman Library and the Paul Himmelfarb Health Sciences Library. The stacks are open, and all students are welcome to browse at their leisure. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use.

All students using the libraries are expected to be familiar with the regulations governing their use, which are available at each library.

### Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the Safety and Security Office.

### Fees and Financial Regulations

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the academic year 1990-91 and the 1991 summer sessions. Costs for academic year 1991-92 are to be announced shortly after this *Bulletin* goes to press. Costs are expected to increase in subsequent years.

#### Tuition Fees

M.D. candidates, for the academic year:*	
Entering students .....	\$23,600
Returning students .....	23,300
M.P.H. candidates, per credit hour .....	445
Students in undergraduate health sciences programs .....	†

Registration Fee (nonrefundable, charged all students per semester and summer registered):

Registration prior to the beginning of the semester .....	25
Registration during the first week of the semester .....	75
Registration after the first week of the semester .....	125

\* M.D. candidates who take courses offered by other divisions of the University during the summer sessions pay the summer sessions rate of \$445 per credit hour. For the Five Year Program, see page 24.

† Tuition fees for undergraduate health sciences students vary by program and location. Please check with the Office of Health Sciences Programs Administration for specific rates.

## 12 School of Medicine and Health Sciences

**Marvin Center Fee** (charged all students registered on campus)  
Per credit hour, to a maximum of \$120 per semester

**Additional Course Fees**—In certain courses additional fees, such as laboratory and material fees, are charged by semester as indicated in the course descriptions. If breakage of apparatus is in excess of the normal amount provided for in the laboratory fee, the student will be required to pay such additional charges as are determined by the department concerned.

**Computer Usage Fees** (charged for courses that use the computer facilities of the University)—Applicable fees are listed in the *Schedule of Classes* for each semester. The maximum computer usage fee is \$100 for any semester.

**Cost of Textbooks and Equipment for M.D. Candidates**—The average cost of textbooks and equipment (such as a microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, and uniforms) is approximately as follows: first year, \$1,200, second year, \$1,000, third year, \$475, and fourth year, \$400. Microscopes must be provided by the student; rentals are not available from the School.

### Special Fees and Deposits

Application fee (degree candidate), nonrefundable	\$45
Advance tuition deposit, nonrefundable, charged each entering or readmitted full-time undergraduate student	75
Graduation fee (charged all students applying for graduation)	50
Late-payment fee (see Payment of Fees, below)	
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason	15
Special Columbian College of Arts and Sciences departmental examination to qualify for receiving credit (advanced standing), waiver of requirement, or both	100
Waiver examination to qualify for advanced placement	25
English test for international students (when required)	20
Laboratory check-out fee, for failure to check out of chemistry laboratory by the deadline date set by the instructor (a student who drops a chemistry course before the end of the semester must check out of the laboratory at the next laboratory period)	10
Transcript fee	25
Replacement of lost or stolen picture identification card	40
Replacement of diploma	

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the use of the University libraries; (2) the services of the Career and Cooperative Education Center; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified; (5) medical attention as described under Student Health Service. These privileges terminate when the student withdraws or is dismissed from the University.

### Payment of Fees

**M.D. Program**—The annual tuition fee for the M.D. program is payable in two equal installments on or before registration day for each semester. M.D. students who register during the summer for courses offered in other divisions of the University are charged the regular summer tuition and other fees.



**Physician Assistant Program**—The annual tuition for the physician assistant program is payable in three equal installments on or before registration for each semester. The summer sessions portion of the program is considered a regular semester.

**All Other Programs**—Except for those programs listed above, tuition and fees will be assessed each semester on the basis of the program of studies for which the student registers.

**Payment Policies**—When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for six credit hours or more may elect to use deferred payment at the time of registration, permitting payment of one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by \$2,600 or more. Under such circumstances the student may be permitted to pay one-half of the amount due at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

Acceptance by the University of a student's fees does not in any way obligate the School of Medicine and Health Sciences to accept the student for any subsequent semester or summer session, and the right is reserved to require the withdrawal of any student whenever, in the interest of the student or the School, the Executive Committee of the Medical Center deems it advisable to do so.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

**GM Monthly Payment Plan**—The University's Monthly Payment Plan is available to all students. Upon receipt of the appropriate application, the University will establish an account and mail payment coupons and envelopes for use to ensure

proper credit of payments. The plan covers an academic year (excluding summer sessions) and requires ten monthly payments, May through February. Payments must be received by the 10th of each month. If a decision is made after May to leave this plan, all missed payments must be made to bring the account current to the time participation is initiated. There is no charge and no interest for using the plan if all payments are made as scheduled.

**Commercial Prepaid and Deferred Payment Plans**—Several commercial programs for parents who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

Mellon Bank Edu-Check Plan, P.O. Box 8888, Wilmington, Del. 19899  
 Knight Insured Tuition Payment Plans, 53 Beacon Street, Boston, Mass. 02160  
 School-Chex, Irving Trust Company, 61 Broadway, New York, N.Y. 10007  
 Educational Loan Program, Consumer Credit Department, Riggs National Bank  
 1120 Vermont Ave., N.W., Washington, D.C. 20005  
 The Tuition Plan, Inc., 57 Regional Drive, Concord, N.H. 03301

### **Withdrawals and Refunds**

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean. Notification to an instructor is not an acceptable notice. Financial aid recipients must notify the Office of Student Financial Aid in writing.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters. No refund of the \$200 tuition deposit required of entering undergraduate students is granted.

1. **Complete withdrawal from all courses**

Withdrawal dated on or before Friday of the first week of classes .....	80%
Withdrawal dated on or before Friday of the second week of classes .....	60%
Withdrawal dated on or before Friday of the third week of classes .....	25%
Withdrawal dated on or before Friday of the fourth week of classes .....	None
Withdrawal dated after the fourth week of classes .....	None
2. **Partial withdrawal.** If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. **Withdrawal from Year 3 of the M.D. program.** The school is aware that a student wishing to transfer to another university between the second and third years of the M.D. program may need to register for Year 3 at this School before receiving word of acceptance from the intended new program. Therefore, if a student has informed the School that he or she is attempting to transfer and learns that the transfer application has been successful only after registering for Year 3 at this University, the following refund schedule will apply:
 

Withdrawal dated on or before Friday of the fourth week of Year 3 classes .....	100%
Withdrawal dated on or before Friday of the eighth week of Year 3 classes .....	00%
Withdrawal dated after the eighth week of Year 3 classes .....	None
4. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
5. **Summer Sessions.** In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days following the scheduled registration day. No refund will be made for courses thereafter.



Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

## Student Life

The Office of the Vice President for Student and Academic Support Services establishes policy and procedures for those departments that affect student life, including the offices of Admissions, Student Financial Assistance, Campus Life, Safety and Security, Athletics and Recreation, and the Dean of Students (which includes Housing and Residence Life, the Student Health Service, the Counseling Center, the Career and Cooperative Education Center, International Services, Disabled Student Services, and the Educational Opportunity Program). More detailed information on these and other activities is contained in the *Student Handbook*.

### Student Health Service

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be arranged by appointment or, during certain hours, secured on a walk-in basis. Many routine laboratory tests may be performed in the Health Service lab at cost. Allergy shots, immunizations, and various lab tests are done at little or no charge. Psychiatric evaluation, crisis intervention, and short-term therapy are available by appointment.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the emergency room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs are not eligible. The bills incurred from all services rendered outside the Student Health Service (for example, X-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

**Health and Accident Insurance**—The University has arranged for and endorsed group health and accident insurance, on an elective basis, for all students. Interested students should consult the Student Health Service or the Office of the Dean of Students.

### Residence Halls and Food Service

The University's residence halls and food service are operated on the basis of the regular academic year (late August through early May). They are, therefore, not a useful option for most students in the School of Medicine and Health Sciences. Information on residence halls and food service is available from the office of Housing and Residence Life, Rice Hall, fourth floor, 2121 I Street, NW.

### Cloyd Heck Marvin Center

The Marvin Center is the campus community center, offering programs, services, and facilities for students, faculty, staff, alumni, and University guests. It also provides facilities for programs conducted by the University Program Board, the academic departments that include the performing arts, and other University organizations.

The *Off Campus Housing Resource Center*, located on the ground floor of the Marvin Center and open 24 hours a day, maintains a listing of apartments, rooms and houses for rent in the Washington metropolitan area.

## Facilities

### *Walter G. Ross Hall*

Walter G. Ross Hall, opened in 1973, houses the teaching and laboratory facilities for students in the School of Medicine and Health Sciences. It occupies a city block on the northwest edge of the University campus; its total area is approximately 550,000 square feet, or more than 10 acres.

### *Educational Support Services*

A group of core facilities and services supports the educational, clinical, and research programs of the Medical Center. Coordinated under the Office of Academic Affairs, these services include the following.

*Office of Educational Resources (Shelley Bader, M.L.S., Director)*—This office coordinates information and educational support services for the Medical Center through the Himmelfarb Health Sciences Library and Biomedical Communications.

The library's collection includes more than 120,000 volumes and 1,000 serial subscriptions. The library maintains an extensive audiovisual study center and microcomputer laboratory including video programs, computer-aided instruction software, and interactive media for all components of the curriculum. A locally mounted subset of the National Library of Medicine's MEDLINE database is available as well as other information and bibliographic databases and electronic mail.

Biomedical Communications supports the professional activities of Medical Center faculty, staff, and students requiring photographic, illustrative, graphic, and print media.

*Office of Academic Computer Services (Helmuth F. Orthner, Ph.D., Director)*—This office offers computer assistance in such areas as educational testing, evaluation of student feedback, course registration, continuing medical education credit reporting, conference management, and automation of library procedures and inventories. The office also supports small databases for research projects that require interactive data maintenance or use forms that can be optically scanned and it can transmit data to the University Computer Center for more sophisticated processing. The office also has facilities for word processing and serves as an interface for computer-assisted educational material from Massachusetts General Hospital and Ohio State University.

The facilities of the office include an on-line optical scanner (NCS 7001), a DEC PDP 11/60 minicomputer using the ANSI STANDARD MUMPS language environment, an on-line RJE 3780 communications link to the IBM 4381 in the University Computer Center, a Gandalf communications facility to connect terminals from various locations of the School via dedicated lines using high-speed modems, and several dial-up ports for the switched telephone network.

*Office of Education (Rhonda M. Goldberg, M.A., Director)*—The Office of Education works with faculty and students to improve the educational environment. It conducts evaluations of courses and curricula and works toward the establishment of effective systems for evaluating student performance.

### *The George Washington University Hospital*

The George Washington University Hospital, adjacent to the School of Medicine and Health Sciences, is an acute-care facility with 501 adult and 39 pediatric beds. The hospital serves as the primary teaching site for students in the School of Medicine and Health Sciences and for more than 400 physicians participating in the 19 accredited postgraduate training programs offered by the Medical Center. The



hospital records approximately 20,000 patient admissions each year and provides a broad range of tertiary care services to an equally broad-based patient population.

The Medical Faculty Associates (MFA) is a private group practice of 200 full-time physicians who practice exclusively at the hospital and are dedicated to its mission of education and quality patient care. The MFA physicians make up the full-time clinical faculty of the Medical Center and represent all medical specialties, including the hospital-based specialties of radiology, pathology, anesthesiology, and emergency medicine. The MFA physicians receive approximately 150,000 patient office visits annually. The emergency medicine group staffs the hospital emergency unit—one of the busiest in the city—and contributes more than 50,000 visits per year. The MFA physicians' offices are consolidated in the 13-story H.B. Burns Memorial Building, adjacent to the University Hospital.

The George Washington University Health Plan (GWUHP), a health maintenance organization, opened in 1972 to provide patient care and to provide students and house staff with educational experience in a prepaid health plan setting. The GWUHP has approximately 40,000 subscribers.

#### ***The Helen I. and Mary E. Warwick Memorial Building***

This building houses a computerized multitest facility that is available to physicians for patient evaluation, the intensive care unit research project, and the radiation safety office.

#### ***Affiliated Hospitals***

***Children's Hospital National Medical Center***—Children's Hospital is the site for the School's Department of Pediatrics and offers a comprehensive clerkship experience for third year students and a variety of elective opportunities in the fourth year. The hospital provides primary and tertiary care to children in the greater Washington area and is a referral center for children throughout the world.

***Fairfax Hospital***—This 656-bed voluntary community teaching hospital, part of a four-hospital system, serves a burgeoning suburban area and provides all clinical services, including psychiatry. Fairfax Hospital offers a rotating internship program, a school of medical technology, and clinical facilities for a school of practical nursing. Students of the School of Medicine and Health Sciences serve at this hospital in clinical clerkship and elective programs. Fairfax Hospital is an affiliated hospital for residency training in obstetrics and gynecology in the George Washington University Medical Center Program.

***Holy Cross Hospital***—Holy Cross, a 450-bed hospital, is a primary clinical campus that provides students with firsthand exposure to the practice of medicine in the community. It is a private, voluntary facility that provides a full range of medical, surgical, and pediatric services for a growing suburban population. The hospital has consistently had one of the highest occupancy rates in the metropolitan area.

***National Naval Medical Center***—The National Naval Medical Center, Bethesda, Maryland, is a 500-bed general hospital that offers a wide range of specialized services, clinical research, and educational programs. Medical care is provided to active-duty and retired military personnel and their dependents. It is a major referral center for thoracic and cardiovascular surgery as well as for cancer therapy. The teaching staff directs internship, residency, and fellowship programs in 25 specialties.

***Saint Elizabeths Hospital***—Saint Elizabeths Hospital, formerly a federal psychiatric facility established by an 1852 Act of Congress, is now operated by the District of Columbia. Medical students at George Washington University use the facilities of Saint Elizabeths for part of their clinical psychiatric training. A continuing research program is conducted at the hospital under a cooperative arrangement with the

National Institute of Mental Health. The hospital maintains an up-to-date health sciences library.

*Veterans Administration Medical Center*—This 708-bed medical center has medicine, surgery, neurology, and psychiatry bed services. Other clinical services include radiology, nuclear medicine, laboratory (pathology), rehabilitation medicine, and radiation therapy. A 120-bed nursing home has recently been opened. At any time, 140 residents and nearly 100 medical students are receiving training at the VAMC under the supervision of 120 full-time staff physicians and a number of part-time staff physicians, consultants, and attending physicians. Specialized-care programs include drug and alcohol rehabilitation, open-heart surgery, radiation therapy, and an extensive dialysis program.

*Washington Hospital Center*—This 821-bed private, not-for-profit institution serves the greater Washington area through patient care, teaching, and research. A 74-bed intensive care tower supports the trauma and medical services, the cardiology and open-heart surgery programs, and the area's only adult burn service. The center offers approved postgraduate programs in all specialties except psychiatry and pediatrics for 205 residents and fellows. In addition, clinical rotations or teaching programs are provided for nurses, medical technologists, X-ray technicians, and other allied health professionals.

### Committees 1990-91

*Academic Freedom and Ethics*, S. Perlin (Chair)

*Admissions and Advanced Standing*, J. Orenstein (Chair)

*Appointments, Promotions, and Tenure*, J. Wiener (Chair)

*Bylaws*, S. Karmi (Chair)

*Communications and Educational Resources*, P. Labropoulos (Chair)

*Continuing Medical Education*, M. Hill (Chair)

*Educational Evaluation*, J. Wiener (Chair)

*Educational Planning*, S. Kent (Chair)

*Graduate Medical Education*, W. Wilson (Chair)

*Health Sciences Programs*, R. Hirsch (Chair)

*Public Relations*, R. Siegel (Chair)

*Student Affairs*, J. Scott (Chair)

*Research*, G. Fiskum (Chair)

*Health Sciences Graduate Student Evaluation*, V. Cohn (Chair)

### Alumni Associations

#### General Alumni Association

The objectives of this association are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes and to promote the general welfare of the University.

Membership in the association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership.

A Governing Board, composed of members representing the constituent alumni of the University's schools and colleges, directs the activities of the association. The voluntary leadership of the association works closely with the staff of the Alumni Relations Office in carrying out association affairs. The association may be contacted through the Alumni Relations Office.

#### Medical Alumni Association

The George Washington University Medical Alumni Association, established in 1959, continues the organization previously known as the George Washington



**University Medical Society** The purposes of the association are to provide constructive services for the M.D. degree alumni of the School of Medicine and Health Sciences and to promote the welfare of the School, its students, the George Washington University Hospital, and its trainees.

The membership of the association consists of all M.D. degree graduates of the School; current members and, on application, past members of the teaching staff of the School who hold doctoral degrees; and doctors of medicine who have had one or more years of postgraduate training in the George Washington University Hospital. Junior membership is granted to all students in the M.D. degree program.

The Medical Alumni Association maintains an office in the School of Medicine and Health Sciences.

## The Doctor of Medicine Degree Program

### Admission

The George Washington University School of Medicine and Health Sciences seeks to admit intellectually gifted, empathetic, and mature students who have the capacity to excel in the science and art of medicine. Updated information on admission requirements, the application process, the program, and the curriculum is provided in a brochure available from the School's Office of Admissions. Applicants are encouraged to review this document carefully.

### Admission Requirements

To be considered for admission to the Doctor of Medicine (M.D.) degree program, applicants must have successfully completed a minimum of 90 credit hours at an accredited U.S. or Canadian institution of higher education. Professional school credit may be applied toward fulfillment of this minimum requirement only if the credit has already been accepted by the applicant's college or university toward a bachelor's degree. (Under the quarter system, a credit is two-thirds of a credit hour.) In most instances, applicants should complete four full years of undergraduate study; only exceptional applicants are accepted upon completion of the minimum requirements.

Exceptional students with three years of undergraduate work in George Washington University's Columbian College may be admitted to this medical school and receive a combined Bachelor of Arts-Doctor of Medicine degree (see page 23).

An early selection program enables George Washington University undergraduates to apply to the medical school at the end of the sophomore year. Those students accepted create a broad and vigorous program tailored to promote intellectual growth during their last two years in college. After graduation, they may enter the M.D. program. Applications and letters of evaluation are due in mid-May. Contact the Office of Admissions for more detailed information.

The following course work must be completed with satisfactory achievement before the applicant can be certified for matriculation. All required science courses must include sufficient laboratory work to ensure familiarity with the experimental methods and techniques of the disciplines.

**Biology**—eight credit hours, including two credit hours of laboratory, in general biology or zoology, but *not* in botany.

**Chemistry**—eight credit hours of general inorganic chemistry (which may include qualitative analysis), including two credit hours of laboratory, and six to eight credit hours of organic chemistry, including laboratory.

**Physics**—eight credit hours, including at least two credit hours of laboratory.

**English**—six credit hours in composition and literature, which may be the standard introductory college courses or their equivalents.

The number of required courses has been kept to a minimum to enable college students to pursue their own interests in depth. The admissions committee has no preference with regard to the applicant's major area of study. Applicants with majors in the arts, humanities, and social sciences are as admissible as applicants with science majors. The committee does expect, however, that work in the student's chosen area of concentration as well as in the required science courses will reflect scholarly interests and show evidence of significant achievement.

Applicants must submit scores on the Medical College Admission Test (MCAT). MCAT scores will be valid only if the test was taken within three years of the date of expected matriculation.



### Application Procedure

**For Admission to the First Year Class**—The School participates in the American Medical College Application Service (AMCAS). Applications for a place in the first-year class can be obtained only from AMCAS, 1776 Massachusetts Avenue, N.W., Suite 301, Washington, D.C. 20036. When completed, this application is returned to AMCAS for distribution to schools selected by the applicant. The AMCAS application deadline is November 15 of the year preceding that for which admission is sought.

When it receives the AMCAS application, the Office of Admissions will send the applicant a supplemental application requesting information not included on the AMCAS application. The supplemental application must be returned with the nonrefundable supplemental application fee (\$45) no later than December 31. After these materials are reviewed, some applicants will be asked to submit letters of evaluation. The admissions committee will then invite the most promising candidates to come for personal interviews. Applicants will be informed of the committee's final decision as soon after the interviews as possible. Although it does not assume an obligation to report missing or erroneous credentials, the admissions office will try to contact the applicant if it is noted that necessary credentials are missing.

The School also participates in the AMCAS Early Decision Program. Interested applicants should read the AMCAS information booklet included with the AMCAS application materials. Early decision applicants should be aware that (1) they must submit their applications by August 1 of the year preceding that for which admission is sought, and (2) their supplemental applications and all letters of recommendation and transcripts must be received by the Office of Admissions no later than September 1. Decisions on these applications are usually made by October 1 and no later than October 15.

Applicants should refer to the AMCAS information booklet and to the admissions brochure available from the School of Medicine and Health Sciences Office of Admissions for the most up-to-date information available at the time of application. Details included in those sources supersede information contained in this *Bulletin*.

All applicants are reminded that the submission of false or misleading information on application forms or in connection with the application process will be grounds for rejection. If such submission is discovered after entrance into the School or award of a degree, it will be grounds for dismissal or for revocation of the degree.

**For Admission With Advanced Standing**—Information and applications for admission with advanced standing should be obtained from the Office of Admissions (M.D. Program), School of Medicine and Health Sciences, 2300 I Street, N.W., Washington, D.C. 20037.

Applications may be submitted for either the second or third year. Applicants for advanced standing must meet all requirements for admission to the first year of study in the School of Medicine and Health Sciences (see Admission Requirements). All applicants, except those currently enrolled in Doctor of Medicine degree programs at U.S. or Canadian schools, will be required to record scores on each subtest of the Medical Science Knowledge Profile.

All applicants must submit the advanced standing application and \$45 application fee by mid-May, three letters of recommendation, and Medical Science Knowledge Profile or National Board of Medical Examiners examination scores. If accepted, *official transcripts will be required*. The admissions committee will request an interview with selected students. Detailed information and guidelines may be obtained from the Office of Admissions in January of the intended year of transfer.

### Selection Procedures

To process first-year applications fairly and expeditiously, the School uses an evaluation procedure that screens applicants on the basis of undergraduate grades (taking into account improvement in performance in later years), MCAT scores, and

pertinent extracurricular and work experience. Some additional consideration is given to applicants from the Washington metropolitan area and to applicants from George Washington University. There are no age limits.

Following this initial screening, approximately 60 percent of all applicants are asked to submit letters of evaluation. The admissions committee then invites about 1,000 applicants for personal interviews.

When all credentials and interview reports are available, the application is reviewed by the admissions committee. Although grades and MCAT scores are considered, the committee relies heavily on the essay portions of the applications, letters of evaluation, and interview reports in assessing those motivational and personal characteristics it feels are important in future physicians.

Applicants who are offered a place in the class are required, within two weeks, to notify the Office of Admissions (M.D. Program), School of Medicine and Health Sciences, in writing, of their intent to accept the place reserved. A substantial deposit is required in July and is credited toward the first semester's tuition.

### Program of Study

The curriculum leading to the Doctor of Medicine prepares students for professional lives of continuous learning. It is presumed that all graduates will seek additional training before assuming complete responsibility for independent clinical decision making.

In the first year, students concentrate primarily on basic sciences, including anatomy and biochemistry in the first semester and physiology, microbiology, and neurobiology in the second.

First- and second-year medical students may, at their discretion, register for electives in addition to the required program of study. The first two weeks of an elective are probationary, so that students may determine whether the elective is suited to their needs. Students may not drop an elective after this probationary period.

The second year integrates clinical information and basic sciences, particularly pathology and pharmacology. Medical students are introduced to physical diagnosis during the first semester of the second year. The course of study is coordinated by a program director, who works with faculty subcommittees and the second-year subcommittee on educational planning.

During the final two years, the program consists of required clerkships and elective sequences designed to prepare the student for graduate training. Clerkships are required in medicine, surgery, pediatrics, obstetrics and gynecology, psychiatry, health care sciences, anesthesiology, and emergency medicine. Each student must also complete an acting internship in medicine, pediatrics, or family medicine, a nonclinical (didactic) course, and a clinical course in neurosurgery or neurology. In addition, students choose from options in orthopaedics, urology, ophthalmology, pediatric surgery, and otolaryngology.

A variety of elective experiences are available at the University and its affiliated hospitals; permission may be granted to take electives elsewhere.

### Honors

Students will be graduated "with distinction" if they have received no failing or conditional grades during the four-year program leading to the Doctor of Medicine degree and either (1) have received Honors grades in at least 50 percent of the total credit hours earned in required courses during the first three years or (2) have received Honors grades in more than 45 percent of the total credit hours earned in required courses during the first three years and have been recommended by a faculty committee on the basis of a strong fourth-year performance.



## Joint Degree Programs

### *Combined Bachelor of Arts and Doctor of Medicine*

To be recommended for the degree of Bachelor of Arts, the candidate must complete at least 90 credit hours of prescribed college work (including a minimum of 30 hours in second-group courses in Columbian College of Arts and Sciences) and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum, the student is eligible for the degree of Doctor of Medicine.

It should be understood, however, that admission to Columbian College does not guarantee admission to the School of Medicine and Health Sciences.

### *Joint Master of Science and Doctor of Medicine*

The departments of the School of Medicine and Health Sciences cooperate with the Graduate School of Arts and Sciences in offering programs leading to the joint degrees of Doctor of Medicine and Master of Science in the fields of biochemistry, genetics, microbiology, mycology, pharmacology, and physiology.

Students in the School of Medicine and Health Sciences who wish to pursue a joint degree program must meet the requirements for admission to the Graduate School of Arts and Sciences. They must be recommended by the chair of the department, the dean of the Graduate School of Arts and Sciences, and the dean of the Medical Center, for academic affairs.

The Master of Science program consists of a minimum of 30 hours of credit. A maximum of 12 hours of credit for graduate-level courses completed as a part of the Doctor of Medicine degree curriculum (and not already applied toward the bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 credit hours of work, which in most programs includes a thesis, must be work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

### *Joint Doctor of Medicine and Doctor of Philosophy*

In cooperation with the Graduate School of Arts and Sciences, a dual program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements that must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and the Graduate School of Arts and Sciences.

To enter the joint degree program, a prospective student must apply for and gain admission to both the Graduate School of Arts and Sciences and the School of Medicine and Health Sciences. If admitted to both schools, the student may apply for affiliation with the joint degree program. Work toward the Ph.D. is performed under the jurisdiction of a departmental doctoral committee and is available in more than 50 research fields.

A student working toward these degrees may apply a maximum of 24 credit hours of approved work taken in the M.D. program toward the minimum of 48 hours of course work required to qualify for the General or Cumulative Examination for Ph.D. candidacy. This course work is normally taken during the semesters that alternate with the medical program and in the years following the award of the M.D. degree. The student's research for the dissertation may begin concurrently with the final 24 credit hours of graduate course work leading to the General or Cumulative Examination. The estimated time for completion of this joint program is six years.

Details of the requirements for the degrees of Master of Science and Doctor of Philosophy are included in the *Graduate Programs Bulletin* of the University, available from the Graduate School of Arts and Sciences, George Washington University, Washington, D.C. 20052.

### ***Joint Doctor of Medicine and Master of Public Health***

Students who wish to pursue the Master of Public Health in conjunction with the Doctor of Medicine must apply separately to each program. Those admitted must fulfill all requirements for each degree, although a limited amount of credit may be applied toward both degrees with the approval of the dean for academic affairs. By taking MPH courses during the summer and elective periods, medical students should be able to complete both degree programs in time to enter residency training on the usual schedule. For specific requirements of the MPH program, see the Master of Public Health Degree Program in this *Bulletin*.

### **Division of Special Programs**

A special division has been created to allow flexibility in the pace at which selected students may proceed toward the MD degree. In most U.S. medical schools, including GW, students are required to take a full load of courses each semester or quarter. The Division of Special Programs offers the opportunity to take courses at a decelerated pace. At the present time, it is not a division to which students may apply directly. Access is offered by administrative action, on advice of the Admissions Committee, or in some cases, following faculty review of academic performance. There are currently two programs within the Division.

#### **Five-Year Program**

The decelerated Five-Year Program enables selected students to spread the highly compressed work of the first year of the MD program over two years. Applicants are invited to enter this program if, in the view of the Admissions Committee, they show great promise but present cause for concern because of weaknesses or aberrances in academic preparation. Typical problems would be poor or inconsistent grades or MCAT, or a long period intervening between completion of undergraduate work and application to medical school. If, in the view of the Admissions Committee and administration there is a reasonable expectation that the student's preparation for the remainder of the program would be strengthened by deceleration in the first year program, the student may be invited into the program. Courses are taken with students in the four-year program. To continue beyond the first year, in each course of more than two credits, five-year program students must achieve grades in each course of more than two credits not lower than one standard deviation below the mean for medical students taking the course in the regular program that semester. (This is usually higher than the minimum level of performance required for a grade of "Pass.")

#### **Remedial Program**

Students who have experienced academic difficulties that cannot be addressed during the summer, or that require repetition of one or more major courses during the following academic year, may be assigned to the Division of Special Programs to take those particular courses. This occurs by administrative action following faculty review, and enables students to retake courses without paying full tuition (see below).

**Tuition**--Tuition in the Division of Special Programs is based on the number of credit hours taken. The fee per credit hour is derived by dividing the annual tuition for MD candidates by the number of credit hours regularly taken by students in that year. Thus, for students in the Five-Year Program, the tuition for first-year courses is divided over two years. For students in the Remedial Program, tuition is paid only for those courses in which the student is enrolled.



## Regulations for M.D. Candidates

### A. General

1. Using the guidelines below, the Educational Planning Committee will periodically determine and report to the Faculty Senate on the appropriateness and number of credits for all courses.

#### First- and Second-Year Courses

- a. Lecture courses: one credit hour for each hour of lecture time per week per semester, adjusted as appropriate.
- b. Laboratory courses: one credit hour for each two or three hours of laboratory time per week per semester, adjusted if appropriate.

#### Third- and Fourth-Year Courses

- c. Clinical courses: five credit hours for each four weeks of clerkship, three credit hours for two-week clerkships.
2. The minimum academic requirement for the M.D. degree will be the completion of all courses designated by the Faculty Senate to be required and a passing grade in all courses taken, whether required or not, other than electives in the first and second years.

### B. Evaluation of Academic Performance

1. Faculty are responsible for evaluating the performance of students in a meaningful, useful, and timely manner.
2. A preclinical evaluation form will be used in all first- and second-year courses. This form will be prepared in triplicate at the end of each course and distributed as follows: one copy to the dean for academic affairs, to be included in the student's file, one copy to the department, and one copy to the student.
3. A clinical evaluation form will be used in all third- and fourth-year courses. This form will be prepared in triplicate at the end of each clerkship or elective and distributed as follows: one copy to the dean for academic affairs, to be included in the student's file, one copy to the department, and one to the student. This form shall
  - a. list the attribute being evaluated,
  - b. provide for indication of the quality of performance, and
  - c. provide space for written comments, which are required.
4. Each department offering required courses should designate an evaluation coordinator to be in charge of student evaluation.

### C. Grades

1. The authority for the assignment of grades rests primarily with academic departments or with interdisciplinary faculty. Exceptions are grades of Incomplete and Withdrawal (see below), which may be assigned only for reasons acceptable to the dean for academic affairs.
2. Departments are responsible for the assignment of grades on a rational, just, and unbiased basis.

3. The grading system for all nonrequired electives will be

Pass (P)

Fail (F)

For all required courses and senior electives, the grading system will be:

Honors (H)

In Progress (IP)

Pass (P)

Incomplete (I)

Fail (F)

Withdrawal (W)

Conditional (CN)

Exempt (EX)

## 4. The following definitions apply:

*Honors (H)*

Those students whose performance in a subject is determined by the department concerned to be of superior quality and who, in addition, have demonstrated at the highest level those qualities of intellectual curiosity, motivation, and self-discipline that clearly set them apart from the majority of the group may be assigned the grade of Honors (H).

*Pass (P)*

All students, with the exception of those defined above, whose performance in a subject at least meets the requirements established by the department concerned shall be assigned a grade of Pass (P).

*Fail (F)*

Those students whose performance in a subject clearly falls so far below departmental passing standards that limited remedial work would be inadequate to correct the deficiencies shall be given a grade of Fail (F).

*Conditional (CN)*

Those students who do not meet the minimum requirements established by the department concerned but who could reasonably be expected to do so through a limited program of remedial work developed by the department and approved by the Committee on Educational Evaluation shall be assigned the grade of Conditional (CN).

*In Progress (IP)*

The notation of IP will be assigned to students in courses that require more than one semester for completion. A grade will be assigned upon completion of the entire course in a subsequent semester.

*Incomplete (I)*

The notation of I will be assigned when a student fails to complete all the required work in a course for reasons acceptable to the dean for academic affairs. Assignment of an Incomplete requires the prior approval of the dean for academic affairs or his/her designee on a case-by-case basis. A student in the first or second year may not proceed into the work of the following year until a grade of I has been removed; if not removed, a grade of I will be changed automatically to a grade of F after one year. A student in the third or fourth year must remove a grade of I prior to graduation.

*Withdrawal (W)*

The notation of W will be assigned only when a student is unable to continue in the course for reasons acceptable to the dean for academic affairs. Such reasons may *not* include scholarship.

*Exempt (EX)*

The notation of EX will be assigned when a student is excused by a department from taking a required course on the basis that s/he is already proven competent in the subject or when a student is given credit for passing an equivalent course in another institution.

5. All departments should submit F and CN grades to the office of the dean for academic affairs as soon as possible after the completion of a course or clerkship.

A grade of F requires that the student repeat the course or an equivalent remedial experience at this or some other institution approved by the department and the dean for academic affairs prior to proceeding to the work of the following year. Upon completion of the requisite course with a grade of P or its equivalent, the student shall be permitted to continue in the



M.D. program, and the grade of F will be converted to F P if the passing grade was given by our faculty or F EX if the course was taken at another institution. The grade of CN is not a passing grade and must be upgraded prior to the beginning of the next academic year or, in the case of clinical subjects, prior to graduation. Upon certification by the department that the student has attained suitable proficiency in the subject, the student shall be permitted to continue in the M.D. program and the grade of CN will be converted to CN P. A student may, in lieu of such a program, elect to repeat the course at this or any other institution that is approved by the department concerned. A grade of P or better shall then result in conversion of the CN to CN EX.

Failure to upgrade a CN to CN P or CN EX by one of these procedures within the prescribed period shall result in automatic conversion of the CN to CN/F.

- 6 As soon as possible after receipt of grades, the dean for academic affairs will inform the Committee on Educational Evaluation of the names of all students receiving grades of F or CN and submit their records to the committee for evaluation and recommendations.

The process defined below is designed to provide that protection against improper academic evaluation guaranteed by Section 2 B of the Statement of Student Rights and Responsibilities.

If a student feels an evaluation or grade to be unjust or inaccurate, s/he may, within five (5) days of receiving the grade, appeal to the signer of the evaluation for a hearing, simultaneously notifying the chairperson of the department. The signer of the evaluation must respond to the student quickly. Failure of the student to initiate such an appeal within five days indicates acceptance of the grade, unless an extension of the time limit is indicated for extenuating circumstances acceptable to the associate dean for student affairs. From this point on, the associate dean for student affairs will monitor the process to assure that it moves forward in a timely manner. If a student remains dissatisfied, s/he should appeal in writing to the chairperson of the department or clinical division promptly for reconsideration of the evaluation. The chairperson shall conduct a review, consulting as appropriate with other faculty and staff, and inform the student in writing of the chairperson's determination at the earliest possible time. If the student remains dissatisfied, s/he may appeal in writing to the associate dean for student affairs. The associate dean or his/her designee will attempt to arbitrate by conferring with the student and authorities within the department.

Should that fail to resolve the complaint, the associate dean will establish an ad hoc committee to review the complaint. The committee will consist of four persons, at least one of whom will be a student, and none of the committee members will be from the department against which a complaint has been registered. The task of the committee will be to advise the associate dean for student affairs about (1) whether or not the evaluational or grading procedures used in that particular case were essentially the same as those used for other students in that course and (2) whether or not there is sufficient evidence of an unjust or erroneous evaluation to warrant referral of the case back to the department for reassessment of the student's competence. Acting upon the committee's advice, the associate dean will either accept the original grade and/or evaluation as valid or refer the case back to the department for re-evaluation and/or grading of the student. The associate dean in cooperation with the department chairperson will determine an appropriate procedure for reevaluation and/or grading of the student. If the student or faculty member chooses to contest further the joint decision of the chairperson and associate dean, or if these two administrators are unable to reach agreement, the dean for academic affairs will review the situation.

and render a final decision on a re-evaluation process. In every case, authority to evaluate and grade students resides in the academic department.

#### D. Academic Dismissal

1. The dean for academic affairs may dismiss a student for academic reasons on **recommendation of the Committee on Educational Evaluation.**
2. The Committee on Educational Evaluation will make its recommendations to the dean for academic affairs after careful review, considering the total number of credit hours of CN and F grades in courses and electives (except first- and second-year electives) attained by the student during the M.D. program. Conditional grades that have been remedied to CN-P and failing grades that have been remedied are calculated as conditional and failing grades, except in the case of a student who has been permitted to repeat a semester or a year. In such cases, the initial grades will not be counted for possible dismissal.
3. The following regulations establish the conditions under which academic dismissal may be recommended:

A student (a) who receives grades of F in required courses totalling 14 or more credit hours in any academic year, or (b) who receives grades of CN and F in required courses totalling more than 20 credit hours of work in any academic year, or (c) who receives grades of F in more than 20 credit hours of required work in the M.D. program, or (d) who receives grades of CN and F totalling more than 30 credit hours of required work in the M.D. program, or (e) who fails to meet any special requirements previously specified for that student by the dean for academic affairs as a condition for continuation in the program, or (f) whose knowledge, competencies, and personal characteristics have not achieved, in the judgment of the Committee on Educational Evaluation and the dean for academic affairs, a satisfactory level of development and integration at any stage of training to justify continuing him/her as a reasonable candidate for the M.D. degree (see also Section F) will be subject to dismissal from the M.D. degree program.

#### E. Irregular Progress

##### 1. Repetition of a Year

Upon the advice of the Committee on Educational Evaluation, the dean for academic affairs may **require** that a student in academic difficulty repeat a year or may **permit** a student at risk for dismissal to repeat a year. Requiring repetition of a year would be an option where there was a pattern of academic problems that would be difficult or impossible to remedy before the beginning of the next academic year. Allowing a student to recycle would be an option where the student was subject to dismissal on academic grounds but showed promise of mastering academic material on an additional attempt and of proceeding without further major difficulty toward becoming a competent physician.

A student eligible for promotion may be allowed to repeat a year at his/her own request.

##### 2. Leaves of Absence

Leaves of absence may be granted at the discretion of the associate dean for student affairs.

##### 3. Withdrawal from the M.D. Program

Withdrawal from the M.D. program is anticipated by the administration to be permanent. In the event that a student later changes his/her mind and wishes to re-enter the program, s/he must reapply through the Admissions Committee as any other candidate for medical school.



## Evaluation of Professional Comportment

*This policy has been reviewed by the University Board of Trustees and established to accommodate the unique curriculum and degree requirements of the Medical Center. Unless the University Vice President for Academic Affairs decides in a particular case to have the case processed under the University Guide to Student Rights and Responsibilities, all cases involving misconduct by M.D. candidates will be processed under these regulations.*

Occasionally, by his/her behavior—or pattern of behaviors—a student may raise concern as to his/her suitability to continue in the study of medicine. It is impossible to catalogue all behaviors that might raise serious questions as to a student's competence to continue in medical school. A process that is described below has been adopted by the Faculty Senate. It is intended to deal with behaviors that may be unacceptable or dangerous to the public if carried into the practice of medicine.

1. The following steps will be the process for identifying and dealing with students with serious problems relating to professional comportment.

- a. When a problem is perceived, the observer will communicate with the associate dean for student affairs. If the communication is verbal, it must be confirmed immediately by a signed letter that will be placed in the student's confidential file, which will be located in the academic dean's office. Access is restricted to the student under consideration, the dean for academic affairs, and the associate assistant deans for student affairs and for education or their designees and, where appropriate, the Subcommittee on Professional Comportment of the Committee on Educational Evaluation. This file will be maintained until the student is awarded the M.D. degree, or until s/he withdraws, transfers, or is dismissed from the University for academic reasons. This file and its contents will be destroyed unless the Committee on Educational Evaluation has acted to make it part of the student's permanent record. In any case in which a student is dismissed from the University for nonacademic reasons, the contents of the file will be preserved permanently as a part of the student's record.

This process may be initiated by the Committee on Educational Evaluation when it is suspected that academic deficiencies are the result of psychological, medical, or behavioral problems.

- b. The associate dean for student affairs (or his/her designee) must meet with the student as soon as possible. Options for the associate dean would include (but not be limited to):
  - (1) Advising the medical student but taking no further action.
  - (2) Recommending that the student seek professional assistance for personal problems that may be impairing professional performance.
  - (3) Developing additional information through contacts with the student, his or her peers, faculty, and/or professional consultants. For example, the associate dean may, with the student's concurrence, refer the student for medical or psychological evaluation. The charge for such an evaluation would be paid by the School of Medicine and Health Sciences, and the professional consultant would be requested to make a written report for inclusion in the student's confidential file.
  - (4) Referring the case to the Subcommittee on Professional Comportment. This committee will consist of two students from the third or fourth year of the M.D. degree program and two full-time faculty, at least one of whom shall be a member of the Committee on Educational Evaluation. No administrative officer, including departmental chairpersons, course coordinators, and residency training program directors, will be eligible to serve on this subcommittee. Appoint-

ment will be for a term of one year. Tenure on the subcommittee will not exceed three years. The committee and its chairperson will be named by the chairperson of the Committee on Educational Evaluation. Students will be chosen from three third-year and three fourth-year students nominated by the Student Council, the others to be retained as possible alternates. All members of the subcommittee will have voting privileges and decisions will be made by majority vote with all four members being present. Minutes of the subcommittee will be kept in the student's confidential file. The chairperson may keep duplicate records for the duration of the review, but these are to be returned to the dean's office at the end of the process.

- c. If it is sent a case for review, the subcommittee will be responsible for gathering information from individuals who may include (but not be limited to) the student in question, his/her peers, faculty, the administration of the medical school, and, where deemed appropriate, professional consultants on medical or psychological aspects of the problem. While meetings of the subcommittee are confidential, the student in question and/or his/her counsel may attend information-gathering sessions as observers.
  - d. If the professional evaluation is requested by the subcommittee, referral will be made by the associate dean for student affairs or his/her designee. As described in Section 1 B (3) above, the cost of this evaluation would be borne by the School of Medicine and Health Sciences and a written report requested for inclusion in the student's confidential file. In contrast, a recommendation for the student to seek professional assistance would remain the concern of the student and not of the School of Medicine and Health Sciences. No contacts by the School will be made to that professional and the expense will be borne by the student.
  - e. The subcommittee will make a disposition regarding each case referred to it as soon as possible. Possible dispositions would include (but not be limited to) advising the student, referring the student for professional assistance for any medical or psychological problem at his/her expense, recommending modification in the student's academic program, and recommending temporary suspension or permanent dismissal from the M.D. program. Any recommendation for modification in the academic program requires that the case be reviewed by the parent committee. The student and, if s/he wishes, the student's counsel may be present during the presentation of information at such a review.
  - f. The subcommittee and/or the parent committee will submit recommendations to the dean for academic affairs or his/her designee.
2. Right of appeal will be as follows: The student will be informed of his/her right to request review by the next higher authority, i.e., the Subcommittee on Professional Comportment, the Committee on Educational Evaluation, the dean for academic affairs, and, finally, the vice president for medical affairs.

#### G. Academic Dishonesty

*This policy has been reviewed by the University Board of Trustees and established to accommodate the organizational and committee structure of the Medical Center. In cases of academic dishonesty involving M.D. candidates that may arise from within the Medical Center, this policy will be used instead of the University Policy on Academic Dishonesty adopted May 19, 1988.*

1. The Medical Center community, in order to fulfill its purpose, must assure integrity of behavior in the academic enterprise, establishing and maintaining guidelines as necessary to do so. All members of the community are expected to exhibit honesty in their academic work. Medical students are



assumed to be familiar with commonly understood principles of academic honesty and with such examples of dishonest behavior as copying answers on examinations, using unauthorized aids to memory in examinations, plagiarizing, presenting papers that were purchased or otherwise acquired as of one's own authorship, and falsifying clinical or research data. They have a special responsibility to learn and observe any special procedures established within the Medical Center to assure integrity of academic behavior. Failure to act in accordance with such procedures will be considered academic dishonesty.

- 2 All members of the community—students, faculty, and staff—have a responsibility to prevent acts of academic dishonesty, or if they have occurred, to note and act upon them and to keep them from recurring.

### 3 Procedures

The remainder of this statement aims solely at informing members of the medical community of their rights and responsibilities with respect to academic dishonesty.

Reports of incidents of academic dishonesty that come to the attention of faculty members, Medical Center staff, or students are to be made by completion of the form entitled "Charge of Academic Dishonesty," after consultation with the departmental chairperson, course coordinator, or director of the service, as appropriate. This form, which identifies the student, describes the nature of the charge, and includes supporting evidence, should be forwarded to the dean for academic affairs and should remain confidential.

Upon receipt of the form, the dean for academic affairs will meet with the student to discuss the charge and supporting evidence and to present the student with a copy of the charge and with a copy of the "Regulations for M.D. Candidates."

If the accuser, the student, and the dean for academic affairs agree on the accuracy of the charges, the fact of this agreement shall be noted by the signatures of all three parties on the form and the case will be referred directly to the Committee on Educational Evaluation for recommendation of appropriate sanctions and modification of the academic program if necessary.

If the student or the dean believes the charge(s) not to be accurate, the case will be referred to the Committee on Educational Evaluation for review by the Subcommittee on Professional Comportment. The proceedings of the subcommittee and/or the parent committee shall be conducted as described in Section F 1 b (4) of these regulations.

### 4 Sanctions

In addition to any other disposition available under Section F, one or more of the following sanctions must be invoked by the dean for academic affairs after considering the recommendation of the Committee on Educational Evaluation.

- a Discarding the work product, which might result in an Incomplete, with the requirement that the student satisfactorily complete compensatory work or be re-evaluated on relevant material.
- b A notation of "Dropped from the course for academic dishonesty" to appear on the transcript, to be expunged one year after imposition of the penalty, or upon graduation, whichever occurs first. Such a notation will not contribute to jeopardy for academic dismissal, but would require repetition of the course if the course is required.
- c A notation of "Dropped from the course for academic dishonesty" to appear on the transcript, with the notation appearing permanently on the record. Such a notation will not contribute to jeopardy for academic

dismissal, but would require repetition of the course if the course is required

- d. Expulsion of the student from the School of Medicine, with the notation of "Academic Dishonesty" placed on the permanent record

#### 5. Safeguards During Procedure

Should the review and any appeal procedures not be completed before the date on which grades are submitted by the department, the grade of Incomplete will be recorded for the student in that course until the charges have been fully adjudicated. The student will not be prevented from meeting other academic requirements—such as taking Part I of the National Board examination or entering into the matching—prior to the imposition of sanctions and completion of all appeals that are to be undertaken. If the student voluntarily withdraws from the institution prior to completion of the review process, the following notation will be placed on his/her transcript: "Withdrew following accusation of academic dishonesty prior to completion of review and determination."

#### 6. Supplemental Guidelines

All departmental chairpersons and course and clerkship coordinators are responsible for informing faculty and staff members about the foregoing statement. Chairpersons are also responsible for publicizing to their students, faculty, and staff any supplemental departmental guidelines for academic honesty appropriate to their discipline.

### H. Policy on Promotions and Graduation—Academic Requirements

1. In general, promotion from one year to another—and recommendation to the Faculty Senate for award of the M.D. degree—will be automatic upon achievement of academic requirements. Under exceptional circumstances when evaluation of personal comportment is pending or completed under procedures described in Section F, promotion or graduation may be postponed, denied, or subject to additional requirements set for individual students by the dean for academic affairs.

#### 2. Specific Requirements

- a. Year I to Year II: Successful completion of all required work of the first year, with performance at least at the passing level (see Section A 2). The student may not begin the work of the second year until all deficiencies of the first year—that is, failing or conditional grades in required courses—have been satisfactorily remedied.
- b. Year II to Year III: Successful completion of all required work of the second year, with performance at least at the passing level (see Section A 2). In addition, receipt in the dean's office of scores on Part I of the National Board of Medical Examiners examination and certification by the Department of Computer Medicine that the student has achieved basic competency in medical computing. (The computing requirement may be met at any time during the first or second year, but must be met prior to advancement into the third year.) The student may not proceed with the work of the third year until all deficiencies in work of the second year have been satisfactorily remedied.
- c. Year III to Year IV: Successful completion of all required clerkships of the third year, with performance at least at the passing level. A student may be permitted to matriculate in the fourth year despite unremedied deficiencies in the third-year performance if those deficiencies are to be remedied prior to graduation during time that would otherwise be available to the student as elective time or vacation.
- d. Eligibility for Graduation: Students will be recommended to the Faculty Senate to be awarded the M.D. degree upon completion of the minimum



academic requirements described in Section A 2 (completion of all courses designated by the Faculty Senate to be required and a passing grade in all courses taken, whether required or not, other than electives in the first and second years) and fulfillment of any additional conditions relating to personal comportment imposed by the dean for academic affairs (see Section F)

#### I Application for Graduation

Application and fee for graduation must be filed in the office of the dean for academic affairs at the time of registration for the last semester of the fourth year

#### J Presence at Graduation

A candidate is required to be present at the graduation exercise unless written application for graduation *in absentia* is approved by the dean for academic affairs

### Financial Aid

All policies regarding student eligibility for financial assistance from institutional and government sources are available from the Financial Aid Office of the Medical Center. Assistance is awarded primarily on the basis of demonstrated financial need. In addition, recipients must be enrolled, in regular attendance, and making satisfactory academic progress in accordance with the Regulations for M.D. Candidates

Information and application materials are available from the Financial Aid Office of the Medical Center, Ross Hall, Room 713, 2300 I Street, N.W., Washington, D.C. 20037. Students who wish to be considered for the loans and scholarships listed below must complete an application for financial assistance each year. The priority deadline for submission of financial aid applications is May 1 for returning students; there is no deadline for incoming students although students should submit their financial aid applications as soon as possible.

#### Satisfactory Academic Progress

The academic requirements of the M.D. program are rigorous, and the progress of each student is carefully monitored. Students are not allowed to continue their course work at the School if they are not considered by the faculty to be capable of attaining the M.D. degree. Therefore, matriculated students who have not withdrawn or been dismissed are considered to be in good standing and making satisfactory academic progress.

As a rule, the M.D. program is completed in four years of full-time study. In some instances, however, the student may be required or permitted to repeat a year (see Irregular Progress, page 28). Students making irregular progress are nonetheless considered to be making satisfactory academic progress, even though the time taken to complete the degree may exceed four years. The specific standards of progress used in determining eligibility for financial aid are as follows:

1. Students who successfully complete required course work within the academic year and move on to the next year's set of requirements meet the satisfactory academic progress criterion for financial aid eligibility and have four consecutive academic years in which they may be eligible to receive financial aid. Students who are having academic difficulty but are able to complete necessary remediation before the beginning of the next academic year are also eligible to receive financial aid for four consecutive academic years.

2. Students may require additional time to complete course work due to academic or personal difficulties. In such situations, the Committee on Educational Evaluation and the associate dean for student affairs may establish a schedule for the student that departs from the norm and may require repeating a year of study. For

such students, the maximum time frame for financial aid eligibility shall be seven (not necessarily consecutive) years.

3 Any period of time spent on approved leave of absence shall be excluded from the maximum established time frame. Students are ineligible for financial aid funds while on leave of absence.

4 Students who are registered through the Office of University Students are not eligible for financial aid funds through the School of Medicine and Health Sciences. In these cases, the University Office of Student Financial Aid determines financial aid eligibility.

*Documentation*—Certification of the satisfactory academic progress of each student receiving financial assistance will be provided to the financial aid office by the associate dean for student affairs. This certification becomes part of the student's permanent file.

*Appeals*—The dean for academic affairs will be responsible for hearing appeals regarding satisfactory academic progress. The financial aid office will accept the decisions of the dean for academic affairs.

### *Scholarships*

Achievement Rewards for College Scientists (ARCS) Foundation, Inc.,  
Scholarship

Anna Bartsch Scholarship Fund

Jack I. Bender Scholarship Fund

Everett Lamont Bradley Scholarship Fund

Elma B. Carr Scholarship Fund

Agnes Neuser Chowe Scholarship Fund

Dr. Edith Seville Coale Scholarships

Joseph Collins Foundation Scholarships

Columbian Women Scholarships Funds\*

Estelle M. Corbett Scholarship Fund

Jessie Fant Evans Scholarship Fund

Lewes D. and Myrtle H. Wilson Memorial Scholarship Fund

Oliver C. Cox Scholarship Fund

Morris H. and Pauline L. Goldenberg Scholarship Fund

Joan Luria Hines Scholarship

Alec Horwitz Grant

Albert A. and Esther C. Jones Scholarship Fund

Ki-Wives of Washington Scholarship Fund

Sidney A. Levine Scholarship Fund

Barbara Logan, M.D., Scholarship Fund

Loughran Medical Scholarship

Medical School Student Financial Assistance Fund

Medical Student Summer Research Scholarships

Morris H. and Helen K. Rosenberg Medical Scholarship Fund

David Perry Steinman Memorial Scholarship Fund

Surdna Foundation Student Aid Fund

James J. Whisman Scholarship Fund

Gordon Fay Willey Scholarship

Winslow Foundation Scholarship

GW Hospital Women's Board Monta Sommer Special Fund

\* The Columbian Women Scholarships are awarded to women who have completed a minimum of 15 hours at this University with a minimum B (3.0) average, or the equivalent. A letter of application for these scholarships should be addressed to the Chairman, Columbian Women Scholarships, care of the Alumni Office, George Washington University, Washington, D.C. 20052, no later than January 18.



### Loan Funds

Morris and Gwendolyn Cafritz Foundation Loan Fund for Medical Students  
 Carroll Memorial Loan Fund  
 Eugene B. Casey Revolving Loan Fund  
 Consolidated Medical Student Loan Fund  
 A.M.A. Medical Student Loan Fund  
 Doreen and Donald Brown Loan Fund  
 Carr Loan Fund  
 Himes Loan Fund  
 Kellogg Medical School Loan Fund  
 Pfizer Loan Fund  
 School of Medicine Student Loan Fund  
 Sommer Loan Fund  
 Sutherland Loan Fund  
 Wrather Loan Fund  
 Abraham I. Gimble Medical School Loan Fund  
 Katharine Graham Medical School Loan Fund  
 Dr. Esther A. Nathanson Memorial Medical Loan Fund  
 Student Council Loan Fund  
 Waller Loan Fund  
 Janice and George Wasserman Medical Student Loan Fund

In addition to the institutional loan funds listed above, two government loan programs are available to students pursuing the Doctor of Medicine. The Health Professions Student Loan Program and the Perkins Loan Program both require that students be citizens or permanent residents of the United States, be in good standing with the School, and have exceptional financial need as determined by federal regulations.

### Veterans Benefits

The Veterans Benefits Office, located on the third floor of Rice Hall, 2121 I Street, N.W., assists students entitled to educational benefits as active-duty personnel, veterans, or widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. The office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting an application to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and includes other information of general interest.

The Veterans Administration is located at 941 North Capitol Street, N.E., Washington, D.C. 20421.

### Awards

Janet N. Glasgow Award of Outstanding Achievement, American Medical Women's Association, Inc.—Awarded annually if the student ranking first in the graduating class is a woman.

American Medical Women's Association, Inc., Scholarship Achievement Citation—Awarded annually to those female students who are considered "honor graduates."

Philip S. Birnbaum Award—Established by the Bloedorn Foundation and awarded annually to a member of the graduating class for demonstrated interest and ability in the field of primary care.

CEA—Geigy Award for Outstanding Community Service—Awarded annually to a member of the sophomore class who has performed laudable extracurricular activity within the community.

*Paul L. DeWitt Award for Surgical Excellence*—Awarded annually to a member of the graduating class who has demonstrated outstanding ability and future potential in the specialty fields of surgery.

*Samuel M. and Miriam S. Dodek Award*—Established in memory of Professor Bernhard Zondek, the eminent discoverer of the endocrinology of the human female reproductive cycle. Awarded annually to a member of the graduating class who has attained a commendable knowledge and understanding of the field of female endocrinology.

*Allie S. Freed Award*—Awarded annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of preventive medicine.

*Walter Freeman Award*—Awarded annually to a student in the graduating class who submits the best essay based on original investigation.

*Donald H. Glew Memorial Awards*—Awarded annually to the winners of the Beaumont Day Competition in student research.

*James Douglas Goddard Award in Pharmacology*—Awarded annually to the outstanding sophomore medical student in pharmacology.

*Alec Horwitz Award*—Awarded annually to a senior who has demonstrated exceptional proficiency in the field of surgery.

*Alec Horwitz First Year Scholar Award*—Awarded annually to the member of the second year class who had the highest percentage of credit hours graded at the Honors level during the first year.

*Alec Horwitz Memorial Award*—Awarded annually to a member of the sophomore class who attains the highest score on Part I of the National Board of Medical Examiners examination.

*Oscar Benwood Hunter Award*—Established by the George Washington University Medical Society, now known as the George Washington University Medical Alumni Association. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in pathology.

*Jacobi Medical Society Award*—Established in memory of Dr. Abraham Jacobi, the founder of pediatrics practice in the United States. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in pediatrics.

*Howard Kane-A.F.A. King-Samuel Dodek Obstetrical Society Award*—Established in memory of Dr. Howard Kane and Dr. A.F.A. King, who served as professors in the School of Medicine and Health Sciences. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in obstetrics and gynecology.

*Dr. Harold Lamport Biomedical Research Award*—Established by the Lamport Foundation in memory of the late, distinguished physiologist, Dr. Harold Lamport. Awarded annually to the student writing the best paper on original laboratory investigation in physiology.

*Lange Medical Publications Award*—Awarded annually to two members of the graduating class who are considered outstanding.

*Hiram W. Lawson Award*—Established by Mrs. Lawson in memory of her husband, who was a distinguished member of the medical staff of the University. Presented annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of obstetrics and gynecology.

*Lemmon Company Student Award*—Awarded annually to a member of the graduating class who has demonstrated outstanding ability in medicine.

*Benjamin Manchester Award*—Established by a grateful patient in honor of Dr. Benjamin Manchester, clinical professor of medicine. Awarded annually to a member of the graduating class who has an outstanding record and shows promise of real humanitarianism in the practice of medicine.

*Merck Manual Awards*—Awarded annually to four members of the graduating class who show high scholastic achievement in medical studies.



*Julius S. Nervaser Award*—Awarded annually to a member of the graduating class who has demonstrated outstanding ability in the clinical aspects of orthopaedic surgery.

*William Newman Award*—Established in honor of the late, distinguished surgical pathologist, Dr. William Newman. Awarded annually to a member of the graduating class who has demonstrated great aptitude and interest in the field of pathology.

*John Ordronaux Award*—Awarded annually to the member of the graduating class who has the highest scholastic standing.

*Hyman R. Posin Award*—Established by Sheila Sloane Dusseau. Awarded annually to a member of the graduating class who has demonstrated outstanding sensitivity to neurologic patients and superior knowledge of neurology.

*Radiology Award*—Awarded annually to a member of the graduating class who has submitted the best original report in the field of radiology.

*Laurence A. Rapee Award*—Awarded annually to the member of the graduating class who has the highest scholastic standing.

*Walter F. Rosenberg Award*—Awarded to the senior medical student who shows the greatest interest, proficiency, and scholastic achievement in dermatology.

*Sandoz Award*—Awarded annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of psychiatry.

*William G. Schafhirt Award*—Awarded annually to a senior student for the best original essay or thesis on some medical subject of current public interest.

*John Achievement Award*—Awarded annually to a member of the graduating class selected by his or her classmates on the basis of outstanding scholastic and personal achievement.

### Honor Societies

*Alpha Omega Alpha*—Third- and fourth-year candidates for the M.D. degree meeting the qualifications specified by the constitution of this national medical honor society are eligible for election to membership.

*William Beaumont Medical Society*—Medical students who have performed original research in the life sciences are eligible for membership, based on the submission of an acceptable abstract of the research and election by society members. Outstanding students present their research findings at the annual Student Research Day. The society also sponsors guest lectures in medical research and assists students in finding research opportunities within the Medical Center.

*Kane-King-Dodek Obstetrical Society*—The 15 third- and fourth-year candidates for the M.D. degree who maintain the highest grades in their work in obstetrics are eligible for membership.

## The Master of Public Health Degree Program

The School of Medicine and Health Sciences, recognizing the rapid changes under way in health care and the growing need for health professionals skilled in data management, epidemiology, preventive medicine, medical administration, and occupational and environmental health, offers a curriculum leading to the Master of Public Health (M.P.H.) degree. The program is designed to develop students' understanding of the operation and financing of health services delivery systems and the biological, physical, environmental, and social factors that affect the health of communities. In addition to taking core courses in public health, each student selects a specialty track in administrative medicine, epidemiology-preventive medicine, or occupational-environmental health. Within the administrative medicine track, students choose a concentration from health policy or management; within the epidemiology-preventive medicine track, students choose a concentration from biostatistics, epidemiologic methods, or health promotion-disease prevention.

The M.P.H. program draws upon the resources of the School of Medicine and Health Sciences, the Department of Health Services Management and Policy of the School of Business and Public Management, the Department of Statistics/Computer and Information Systems of the Graduate School of Arts and Sciences, and the metropolitan Washington public health community.

### Admission

#### Admission Requirements

**Administrative Medicine Track**—For both the management and the health policy concentrations, eligible applicants are those who hold a graduate degree from an accredited university and nurse practitioners or physician assistants who hold bachelor's degrees.

**Epidemiology-Preventive Medicine Track**—Eligible applicants must hold a bachelor's degree from an accredited college or university and must have completed six credit hours of biological sciences other than botany. Additional requirements for the concentrations within epidemiology-preventive medicine follow.

**Biostatistics Concentration**—Six credit hours of mathematics, including at least three hours of differential and integral calculus.

**Epidemiologic Methods Concentration**—Six credit hours of mathematics or computer science beyond the introductory level or six hours of chemistry or physics.

**Health Promotion-Disease Prevention Concentration**—Preference will be given to applicants with a degree in one of the health professions or substantial professional experience in the health field.

**Occupational-Environmental Health Track**—Eligible applicants must hold a bachelor's degree from an accredited college or university and must have completed six credit hours in biological sciences other than botany and six hours in chemistry, which must include at least three hours of organic chemistry (clinical pharmacology may be substituted for organic chemistry).

In addition to the M.P.H. application and two recommendation forms, official transcripts are required from all institutions attended as an undergraduate or graduate student, regardless of whether credit was earned or desired. Transcripts should be sent directly to the M.P.H. Admissions Office from the registrar of each school. Those who do not hold a degree beyond the bachelor's level must submit scores on the GRE, GMAT, or MCAT.

Those interested in the joint M.D.-M.P.H. program must apply to both programs. When the applicant has been admitted to the M.D. program, the M.P.H. application



will be reviewed. Transcripts need be submitted only with the M.D. application. Required recommendations, however, must be sent separately to each program.

Those seeking admission to the joint Physician Assistant-MPH program must complete the application forms for each program, available from the M.P.H. Admissions Office.

### **International Applicants**

**Required Records**—At the time the application is submitted, the applicant must have the educational institutions previously attended send directly to the MPH Admissions Office copies of official certificates and records listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from all colleges and universities attended are required. These copies become the property of the University and cannot be returned. These documents should be in the language in which the institution keeps its official records. If they are in a language other than English, the copies sent should be accompanied by an English translation.

**Language Test**—Students from countries where English is not an official language must show competence in the language by scoring not less than 550 on the first taking of the Test of English as a Foreign Language (TOEFL) or 600 on the second taking. A score of 5 out of 6 on the Test of Written English (TWE), included in the TOEFL, is required. Applicants are responsible for making arrangements to take the test and should address inquiries to TOEFL, CN 6151, Princeton, N.J. 08541-6151, U.S.A., well in advance of the semester for which admission is sought. On the application for the TOEFL, applicants should specify that their scores be sent to the MPH Admissions Office, GW School of Medicine and Health Sciences, Box 32, 2400 I Street, N.W., Washington, D.C. 20037. Registration for the TOEFL does not constitute application for admission to George Washington University.

Admitted students who did not score at least 600 on the TOEFL and 5 out of 6 on the Test of Written English (TWE) will be required to take the GW English as a Foreign Language placement test before registering at the University. The results of this test will determine what level of English as a Foreign Language course work, if any, the student will be required to complete before beginning MPH studies. This requirement may extend the length of time needed to complete the program.

Physicians may substitute the English Validating examination of the FMGEMS or ECFMG in place of the TOEFL.

**Financial Certificate**—All international students planning to study at the University under the authorization of a student (F) or exchange visitor (J) visa must complete a Financial Certificate and submit it with the application for admission. Satisfactory completion and submission of the Financial Certificate is required for the issuance of a Form I-20 or IAP-66. Students who need F or J visas should submit their applications, required records, and TOEFL scores no later than May 1.

### **Admission on Probation**

Applicants may be admitted on probation at the discretion of the admissions committee. Such applicants are required to register in the fall semester for a minimum of two core courses from their chosen specialty track and to receive an average grade of B or better to be admitted to degree candidacy. Students admitted on probation should consult the coordinator of their specialty track immediately after the examination period of their first semester to determine whether the conditions for admission have been satisfied.

### **Transfer of Credit**

Up to 12 credit hours of applicable graduate course work completed at an accredited university may be accepted in transfer. The course work must have been taken within the past three years, and the student must have earned a grade of B or better.

Petitions for transfer of credit must be approved by the coordinator of the student's specialty track and the dean. Transcripts and descriptions of the courses must be on file before such petitions can be considered.

### Joint Programs

Qualified individuals may pursue the Master of Public Health in conjunction with a clinical program leading to the Doctor of Medicine degree or the physician assistant certificate. Students must be admitted to each program and must fulfill all requirements for each degree or certificate.

*Doctor of Medicine and Master of Public Health*—This joint program is scheduled to allow students to complete both the MPH and MD degrees and enter residency training on the usual timetable. Students in the program begin MPH course work in the summer before or after the first year of medical school, taking credit hours in a five-week session that starts in mid-July, and continue to take MPH courses as electives during the second year of medical school. Fourth-year medical students in the joint program join full-time MPH students for the spring semester and a five-week summer session that ends in June. The program director must approve the MPH program of study, and the assistant dean for student affairs approves the course of study for the senior year of medical school. The amount of credit that may be applied toward both degrees is determined by the assistant dean.

*Physician Assistant Certificate and Master of Public Health*—Full-time students may complete this joint program in three calendar years. All didactic course requirements of the physician assistant program and most MPH courses are completed during the first two years, while the third year consists primarily of clinical rotations in a variety of health care settings. For specific requirements of the physician assistant certificate program, see page 62.

### Program of Study

#### Degree Requirements

The Master of Public Health program consists of a minimum of 33 credit hours of course work. Seventeen credit hours of core courses are required for all MPH students—PubH 201, 202, 205, 206, 211, 213, 221. The remaining 16 hours are taken in a specialty track or concentration.

#### Administrative Medicine

*Health Policy*—PubH 225, 251, 263, 265, 288, 290

*Management*—PubH 214, 230, 263, 265, 287, and one three-credit elective

#### Epidemiology–Preventive Medicine

*Biostatistics*—PubH 240, 282, 291; PubH 255 or Stat 121; Stat 157, 158

*Epidemiologic Methods*—PubH 220, 240, 251, 255, 280, 293

*Health Promotion–Disease Prevention*—PubH 222, 226, 230, 240, 244, 281, 293

*Occupational–Environmental Health*—PubH 231, 241, 242 or 243, 284, 294

#### Other Program Requirements

While not prerequisites for admission, the following requirements are to be completed either before or during the course of the MPH program. Credit earned in fulfilling these requirements does not apply to the 33-credit-hour degree requirement. In all cases, stated requirements may be waived on the basis of previous course work or professional experience.



All students who have not acquired basic skills in the use of computers are required to complete a tutorial in computers. Students in all three tracks must complete PubH 203. Students in the occupational–environmental track must complete PubH 170. Students in the administrative medicine track and the epidemiologic methods and health promotion–disease prevention concentrations within the epidemiology–preventive medicine track must take PubH 208.

### **Scholarship Requirements**

M.P.H. candidates are required to maintain a minimum cumulative grade-point average of 3.0 in course work required for the degree. Grades in courses taken at other institutions are not considered in computing the grade-point average. For students in the joint M.D.–M.P.H. program, the regulations for M.D. candidates apply to work in all courses credited to the M.D. degree.

A student may repeat a course in which a grade of *C* was received only with the written permission of the program director. If a course is repeated, the first grade remains on the student's record and is included in the cumulative grade-point average.

A student who receives a grade of *F* for a course in the degree program may be recommended for suspension. To remain in the program, the student must submit to the program director a written statement from the specialty track coordinator justifying the student's continuance in the program and outlining the procedure to be followed. Continuation always requires the approval of the dean for academic affairs. The failing grade remains as part of the student's permanent record and is included in the cumulative grade point average.

A student whose grade point average falls below 3.0 will be placed on probation. This probation extends through the period in which the student next attempts 9 credit hours of work. During this period, the student's performance will be monitored to determine whether further study will be allowed. Failure to raise the grade-point average to 3.0 may result in suspension or dismissal. A student so suspended may apply for readmission after the lapse of one semester, submitting evidence that he or she is now better prepared to pursue graduate course work. Students who have been readmitted remain on probation until they raise their grade point average to 3.0. Failure to meet standards defined in advance by the program director and approved by the dean for academic affairs may result in dismissal. Failure to meet the conditions of suspension may also result in dismissal. Any recommendation for dismissal will be reviewed by the dean for academic affairs, at the dean's discretion, the recommendation may also be reviewed by the Faculty Senate's Committee on Health Sciences Graduate Student Evaluations.

### **Use of Correct English**

An instructor may inform the program director if a student's written or spoken English in any course is unsatisfactory. The program director, in turn, may refer the student for further evaluation and recommendation.

### **Time Limits**

All degree requirements must be completed within four years of the date of matriculation in the program, except for students in the joint M.D.–M.P.H. program, who have five years. The time limit does not include any period spent on approved leave of absence.

### **Academic Advising**

The coordinator of the student's specialty track is responsible for monitoring progress and providing information about the curriculum, specific courses of study, and career opportunities.

## Regulations

### Attendance

Students may attend only those classes for which they are registered. Regular attendance is expected.

### Grades

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum Pass; *CR*, Credit; *F*, Fail; *I*, Incomplete; *IP*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal.

When another grade has not been assigned, the symbol *I*, *IP*, *W*, or *Z* will be recorded. The grade of *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. Incomplete work must be made up by a date agreed on by the instructor and the student but no later than the last day of the examination period for the semester immediately following the semester or summer session in which the grade of *I* is assigned. When work for the course is completed, the grade earned will be indicated in the form of *I* followed by the grade. The indication of *I* cannot be removed from the transcript. An Incomplete that is not changed within the specified period automatically becomes an *I/F*. The grade of *I* cannot be removed by reregistering for the course here or by taking its equivalent elsewhere.

The symbol *IP* is reserved for courses (such as special projects) in which the final class date extends beyond the official University deadline for submitting grades.

For students in the joint M.D.-M.P.H. program, courses applied toward both degrees will be listed on each transcript using the grading system of the applicable program. Grade equivalents are as follows: *A* = Honors, *B* = Pass, *C* = Conditional, *F* = Fail.

### Changes in Program of Study

A student may not change specialty tracks or intended schedule for completion of the program, substitute one course for another, drop courses, or change status from credit to audit or audit to credit without the approval of the course instructor, the specialty track coordinator, and the program director.

**Adding Courses**—The deadline for adding a course is the end of the second week following general registration for the semester.

**Withdrawal**—Withdrawal from a course or from the University requires the approval of the coordinator of the student's specialty track, each course instructor, and the dean. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record (see Payment of Fees, page 12). The deadline for withdrawal from a course is the end of the eighth week following general registration for the semester.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations, page 11.

### Credit

Credit is awarded only after registration for a course and satisfactory completion of the required work, or upon approval of a transfer of credit.

### Auditing

A student who has been admitted to the M.P.H. program may register as an auditor in a class only with the permission of the instructor and the program director. An auditor receives no academic credit and is not required to take active part in the class or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. The on-campus tuition rate is charged for audited courses.



### *Continuous Enrollment*

Once registered in a degree program, students are expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester until the degree is conferred. A student who is within the time limits of the degree and has fulfilled all program requirements but is completing outstanding work in a course for which the grade of Incomplete was received must register for Continuous Enrollment each semester.

Students who break continuous enrollment at the University and do not request and receive a leave of absence (see below) must apply for readmission and, if granted, are subject to the requirements and regulations then in force.

### *Leave of Absence*

A student who must interrupt active pursuit of the degree may petition the program director for a leave of absence for a specific period of time, generally limited to one calendar year. If the petition is approved, students must complete a Continuous Enrollment form and return it to 719C Ross Hall. Degree candidates who discontinue their studies without being granted a leave of absence and students granted leaves who do not return to active study at the close of the period of approved absence must apply for readmission and are subject to the regulations and requirements then in effect.

### *Graduation Requirements*

Degrees are conferred in February, May, and September. Applications for graduation must be filed by October 1 for February graduation, February 1 for May graduation, and July 1 for September graduation. Graduating students may participate in the School of Medicine and Health Sciences commencement ceremony, held each year in May. Students who have completed all requirements but have not been awarded the degree will be issued a letter to this effect upon request.

To be recommended for graduation by the faculty, students must have completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree, have filed an application for graduation prior to the published deadline, and be free from all indebtedness to the University. Registration, either for course work or for Continuous Enrollment, is required for the semester or summer session at the close of which the degree is to be conferred.

### *Unclassified Students*

With the program director's permission, unclassified students may register for courses in the M.P.H. program if space is available. An unclassified student who is subsequently admitted to the M.P.H. program may apply a maximum of 12 credit hours of credit toward the degree with the approval of the program director. Transfer credit is awarded only for courses in which a grade of B or better has been earned.

### *Financial Aid*

Information on financial assistance is provided in the Master of Public Health program brochure, published annually by the School of Medicine and Health Sciences.

## Undergraduate Health Sciences Programs

The School of Medicine and Health Sciences offers a broad range of undergraduate programs to prepare health sciences professionals for roles in selected disciplines that complement the medical profession. Recognizing the nation's intricately structured health care system, these programs emphasize the interdependent roles and responsibilities of the network of mid-level health professionals who bring a variety of skills and expertise to the health care team. The programs in medical laboratory technique,\* nuclear medicine technology, prehospital clinical medicine, radiation therapy technology, and radiologic technology\* lead to the Associate in Science. The Advanced Hospital Corps School and nuclear undersea medical technology programs lead to the Bachelor of Science in Health Science,\* and the Bachelor of Science is awarded for completion of the emergency medical services, medical technology, nursing anesthesia, physician assistant, and radiological sciences and administration programs. In addition, certificates are awarded to degree candidates who complete designated requirements in the following programs: medical technology, nuclear medicine technology (on-campus students only), nurse practitioner, nursing anesthesia, physician assistant, and radiation therapy technology. Curricula leading to the certificate only are available in the medical technology, nuclear medicine technology, nurse practitioner, and radiation therapy technology programs.

### Admission

Applicants to any of the health sciences programs at George Washington University must submit a completed application form together with a nonrefundable \$45 fee. The fee is waived for GW degree candidates who are applying to the clinical (fourth) year of the medical technology program, for off-campus military and other contract students, and for students applying for readmission who were enrolled as degree candidates at the time of their last registration at this University and who have not since registered at another institution.

Application forms are available from the office of the program to which admission is sought, except for the first three years of the medical technology program; such applicants should request forms from the Office of Admissions, George Washington University, Washington, D.C. 20052. Applicants should refer to the individual program descriptions for information on prerequisites, supporting documents, and application deadlines, since these vary by program. Application forms for readmission are available from the Office of Health Sciences Programs Administration, George Washington University School of Medicine and Health Sciences, 2300 I Street, N.W., Washington, D.C. 20037. Completed applications for admission or readmission must be returned to the Office of Admissions, George Washington University, Washington, D.C. 20052.

### Required Credentials

Credentials that must be submitted by all applicants are listed below. Please refer to the individual program descriptions for information on additional admission requirements.

Applicants should note that *official* transcripts and score reports must be forwarded directly to the Office of Admissions from the registrar of all academic institutions previously attended or from the issuing agency. Student copies are not acceptable.

\* For off-campus military students only.



**Applicants With No Previous Academic Credit**

1. An official transcript showing that the applicant graduated with an acceptable record from secondary school
2. Official scores on the College Board Scholastic Aptitude Test (SAT) or the American College Testing (ACT) battery, if the applicant completed secondary school within two years of the date of application to a health sciences program. (If the applicant completed secondary school more than two years before the date of application, other tests may be required during the application process.)\*
3. Service school records, where applicable

**Applicants With Fewer Than 30 Hours of Academic Credit†**

1. An official transcript showing that the applicant graduated with an acceptable record from secondary school or has acceptable GED scores
2. Official SAT or ACT scores, for applicants who completed secondary school less than two years before the date of application.\*
3. Official transcripts from each academic institution attended, regardless of whether credit was earned or is desired
4. Service school records or military discharge papers, where applicable
5. Official College Board College-Level Examination Program (CLEP) score reports, where applicable

**Applicants With 30 or More Hours of Academic Credit‡**

1. An official transcript showing that the applicant completed acceptable course work at an accredited college or university, maintained a cumulative grade-point average of 2.0 out of a possible 4.0, is in good standing as to scholarship and conduct, and is eligible to return to the academic institution most recently attended in the same semester for which admission is now sought to George Washington University. Transcripts are required from each academic institution attended, regardless of whether credit was earned or is desired. Students who have been academically dismissed or suspended more than twice will not be considered for admission for at least five years from the date of their last suspension or dismissal
2. Service school records or military discharge papers, where applicable
3. Official CLEP score reports, where applicable

**Students From Foreign Institutions**

**Required Records**—Applicants must request copies of official certificates and records listing subjects studied, grades received, examinations taken, and degrees received from all educational institutions attended. Each institution should mail these credentials directly to the Office of Admissions, George Washington University, Washington, D.C. 20052. Official copies of diplomas and certificates from all secondary schools, colleges, and universities attended are required. Records of state examinations and certificates are also required. These documents should be in the language in which the institution keeps its official records. If they are in a language other than English, the copies sent should be accompanied by a certified English translation. All records become the property of the University and cannot be returned.

**Language Tests**—All applicants from countries where the official language is not English are required to take the Test of English as a Foreign Language (TOEFL) and attain a minimum score of 550 on the first attempt and 600 on the second. Applicants are responsible for making arrangements to take the test and should address

\* Off-campus military students do not need to submit SAT or ACT scores.

† Fewer than 12 credit hours for off-campus students.

‡ Twelve or more credit hours for off-campus students.

inquiries to TOEFL, Educational Testing Service, CN 6151, Princeton, NJ 08541-6151, U.S.A., well in advance of the semester for which admission is sought. On the application for the TOEFL, students should specify that the scores are to be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052. Registration for the TOEFL does not constitute application for admission to George Washington University.

In addition, admitted students who did not score at least 600 on the TOEFL and 5 out of 6 on the Test of Written English (TWE) will be required to take the GW English as a Foreign Language (EFL) placement test prior to registration. The results of this test will determine what level of EFL course work, if any, the student will be required to complete before beginning a full program of study in a health sciences curriculum. College credit is not granted for English study below the level of standard freshman English courses.

**Financial Certificate**—A Financial Certificate must be completed and submitted with the application for admission of all international students planning to study at the University under the authorization of either a student (F) or exchange visitor (J) visa. Satisfactory completion and submission of the Financial Certificate is required for the issuance of a Form I-20 or IAP-66.

#### **Advance Tuition Deposit**

Upon notification of acceptance, a \$300 tuition deposit will be required of all full-time, on-campus undergraduate students, including those readmitted. The deposit is credited toward tuition and is not refundable.

#### **Admission as an Unclassified Student**

A student who wishes to take individual courses in health sciences programs must apply for admission to the University as an unclassified undergraduate student in the School of Medicine and Health Sciences. The assistant dean, in conjunction with the appropriate program director and the chair of the department offering the course, will determine whether admission will be granted to unclassified students. Credit earned for courses taken as an unclassified student may be transferred to a degree program at the University if the courses are applicable to the program. Permission to take individual courses, if granted, will generally be limited to a total of 6 credit hours.

#### **Advanced Standing**

Advanced standing may be awarded toward the associate's and bachelor's degrees for appropriate course work completed with a minimum grade of C at other accredited academic institutions. Advanced standing may also be awarded for nontraditional classroom or clinical experience. The University reserves the right to refuse transfer credit in part or in whole.

Transfer credit is not awarded for English language courses taken in a non-English-speaking country.

Degree candidates who are currently enrolled at this institution and plan to take placement examinations or courses at other accredited institutions for transfer credit must first obtain permission from the Office of Health Sciences Programs Administration.

**Transfer Credit From Academic Institutions**—Health sciences degree programs vary in the amount of advanced standing they will award. Students may obtain further information from the Office of Health Sciences Programs Administration.

**Credit for Nontraditional Classroom or Clinical Experience**—Credit may be awarded for nontraditional classroom or clinical experience through one or any combination of the following:



**Credit from Service Schools**—A limited amount of credit may be assigned for selected service school instruction. Current military students must submit an official DD Form 295; copies of service school records are not acceptable. Veterans should submit photocopies of their discharge papers (Form DD214).

**Special Departmental Examinations**—A student may request approval from the assistant dean, through the program director, to petition any department to take a special examination covering the subject matter of a specific course. Approval of such a request is not granted automatically; the student must offer evidence of sufficient occupational or educational background to indicate a reasonable command of the subject matter. Assigning credit by special departmental examination will depend on the department's evaluation of the examination. The examinations will normally be of at least three hours' duration. A fee for each course examination is charged for preparing, administering, and grading the examination. (In some instances, students may instead request approval to take a waiver examination to satisfy a curriculum requirement. Students do not receive academic credit for waiver examinations. The examination will normally be of at least one hour's duration; a fee is charged for each waiver examination.)

**Credit for College Board College-Level Examination Program (CLEP)**—CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: mathematics, humanities, natural sciences, English composition, and social sciences and history. The CLEP General Examinations in mathematics and English, however, will not fulfill any degree requirements for health sciences students; only the Subject Examinations are acceptable in these areas.

Upon admission to degree candidacy, credit is assigned for General Examinations in natural sciences, humanities, and social science and history passed with acceptable scores. Credit is usually assigned for Subject Examinations passed at the level recommended in the College Board model policy. Credit may not be earned by passing the examination after taking an equivalent course. Arrangements for taking the examinations are the responsibility of the applicant and should be made through the College Board College-Level Examination Program, CN 6601, Princeton, NJ 08541-6601.

**Credit for New York State Board of Regents Examination**—Applicants for degrees who present proper certification of the award of a degree at the associate's level from the New York State Board of Regents may be awarded a maximum of 60 credit hours of advanced standing.

### Readmission

Students previously registered in the University who were not registered the immediately preceding semester (summer sessions excluded) must apply for readmission. Students who have attended one or more academic institutions while absent from this University must have complete official transcripts sent directly to the Office of Admissions from each institution attended. (Active duty or reserve military students who have attended additional service schools must also submit an updated DD Form 295.) Students seeking readmission as degree candidates after previous enrollment in unclassified status must submit all entrance credentials not previously received or required.

Applications for readmission are considered on the basis of regulations currently in effect.

The application fee is waived for students applying for readmission after previous enrollment as degree candidates at this University if they have not since registered at another institution.

## Regulations

### Attendance

Students may attend only those classes for which they are registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

### Scholarship Requirements

**Grades**—Grades are mailed to students from the Office of the Registrar each semester. Grades are not given out by instructors.

The following grading system is used: A, Excellent; B, Good; C, Satisfactory; D, Low Pass; F, Fail; I, Incomplete; IP, In Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal. Other grades that may be assigned are A<sup>+</sup>, B<sup>+</sup>, B<sup>-</sup>, C<sup>+</sup>, C<sup>-</sup>, D<sup>+</sup>, and D<sup>-</sup>. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of D or better was received, unless a petition to do so is approved by the assistant dean upon recommendation of the program director.

When another grade has not been assigned, the symbol I, IP, W, or Z will be recorded. The symbol I indicates that the instructor has received a satisfactory explanation for the student's inability to complete the required work of the course. At the option of the instructor, the grade of I may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. An I automatically becomes an F if the uncompleted work has not been made up within one calendar year of the date of the last class meeting in the semester for which the I was assigned. IP is reserved for courses (for example, clinical rotations) in which the final date extends beyond the official University deadline for submitting grades.

**The Grade Point Average**—Scholarship is computed in terms of the grade-point average, based only on the student's record in this University. The grade-point average is computed from grades as follows: A, 4.0; A<sup>+</sup>, 3.7; B<sup>+</sup>, 3.3; B, 3.0; B<sup>-</sup>, 2.7; C<sup>+</sup>, 2.3; C, 2.0; C<sup>-</sup>, 1.7; D<sup>+</sup>, 1.3; D, 1.0; D<sup>-</sup>, 0.7; F, 0, for each credit hour for which the student has registered in a degree program. (Grades of F will be computed in the grade-point average but will not be considered as fulfilling degree requirements.) Courses marked W, I, or IP are not considered in determining the average, except that any course in which an I or IP has been assigned will be included when a final grade has been recorded. Grades earned at other institutions are not included in computing the grade-point average.

**Dean's List**—Students who achieve a grade-point average of 3.5 or higher in any one semester are placed on the Dean's List for that semester. The Dean's List is limited to full-time students.

**Probation**—A student who has attempted a minimum of 12 credit hours of course work and whose cumulative grade-point average is below 2.0 will be placed on *academic probation*. This probation extends over the period in which the student attempts another 12 credit hours of course work. Students whose attendance or conduct has been unsatisfactory may be placed on *disciplinary probation* for the period in which they attempt the next 12 credit hours of course work.

**Suspension**—Any student whose cumulative grade-point average remains below 2.0 after a 12 credit hour period of probation may be suspended. A student suspended for poor scholarship may not register for course work, even as an auditor. A suspended student may apply for readmission after the lapse of either the fall or



spring semester following suspension. Evidence must then be presented to the assistant dean, through the student's program director, demonstrating that the student is now better prepared to pursue college-level course work. Any student suspended twice for poor scholarship will not be readmitted.

**Dismissal**—Any student who has received one or more failing grades during a semester may be recommended for dismissal by the program director. Such recommendation will be reviewed by the assistant dean and the dean for academic affairs, at the discretion of the dean for academic affairs, the recommendation may also be reviewed by a faculty committee.

### **Withdrawal**

Withdrawal from a course or from the University requires the approval of the student's advisor, each course instructor, and the assistant dean. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record (see Payment of Fees, page 13). The deadline for withdrawal from a course is the end of the fourth week following general registration for the semester (except for off-campus military students).

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations, page 11.

### **Adding Courses**

The deadline for adding a course is the end of the second week following general registration for the semester.

### **Changes in Program of Study**

**Changes Within Health Sciences Programs**—A student may not substitute one course for another, drop courses (see Withdrawal), or change status from credit to audit or audit to credit without the approval of the faculty advisor, the course instructor, and the assistant dean.

**Transfer Within the University**—Application for transfer to another college, school, or division must be made to the appropriate admitting office on the form provided by that office. A maximum of 30 credit hours earned in the Division of Continuing Education may be applied toward a bachelor's degree in the School of Medicine and Health Sciences.

### **Credit**

Credit is awarded only after registration for a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the several colleges, schools, and divisions.

### **Auditing**

A student who has been admitted to a health sciences program may register as an auditor in a class only with the permission of the instructor, the faculty advisor, and the assistant dean. An auditor receives no academic credit and is not required to take active part in the class or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. The on-campus tuition rate is charged for audited courses.

### **Balance Sheet**

After a student has been admitted and has completed the registration process in a particular degree program, program coordinators in the Office of Health Sciences Programs Administration will issue a balance sheet showing course work already completed and degree requirements still to be met. A second balance sheet is issued only if the student changes the major.

### ***Transcripts of Record***

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments due the University at the time of the request. A fee of \$3 is charged for each transcript. Partial transcripts are not issued.

### ***Continuous Enrollment***

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Students who break continuous enrollment at the University and do not request and receive a leave of absence (see below) must apply for readmission and, if granted, are subject to the requirements and regulations then in force. Special provision is made for military students who have completed the certificate components of their programs but, because of work assignment, cannot immediately complete degree requirements. Such students are registered in Continuous Enrollment until they are able to resume course work.

Students who plan to attend other institutions and apply credit so earned toward graduation from this University must first obtain written approval from the assistant dean.

### ***Leave of Absence***

A student who must interrupt active pursuit of the degree may petition the assistant dean, through the program director, for a leave of absence for a specific period of time, generally limited to one calendar year. If the petition is approved, the student must complete a Continuous Enrollment form and return it to the Office of Health Sciences Programs Administration. Degree candidates who discontinue their studies without being granted a leave of absence and students granted leaves who do not return to active study at the close of the period of approved absence must apply for readmission and are subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

### ***Graduation Requirements***

Degrees are conferred in February, May, and September. Graduating health sciences students may participate in the School of Medicine and Health Sciences commencement ceremony, held each year in May.

To be recommended for graduation by the faculty, students must have met the admission requirements of the college or school in which they are registered, have completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree; have filed an application for graduation prior to the published deadline, and be free from all indebtedness to the University. Registration, either for course work or for continuous enrollment, is required for the semester or summer session at the close of which the degree is to be conferred.

Applications for graduation must be filed by October 1 for February graduation, February 1 for May graduation, and July 1 for September graduation. (Off-campus military students should apply upon completion of all degree requirements.)

### ***Honors***

Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: *cum laude*, 3.4–3.59; *magna cum laude*, 3.6–3.79; *summa cum laude*, 3.8–4.0.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and diploma of those students who earn an honors designation. The grade-point average includes all course work.



completed at GW and is not rounded off. To be eligible for an honors designation, a student must complete at least 60 hours of course work at GW.

#### *Award of Certificates to Degree Candidates*

Certificates are awarded to degree candidates who successfully complete designated requirements in the medical technology, nuclear medicine technology, nursing anesthesia, physician assistant, and radiation therapy technology programs. Recipients must be free from all financial indebtedness to the University before certificates are awarded.

#### *Financial Aid*

For full-time undergraduate students, George Washington University has a program of financial assistance consisting of scholarships, grants, loans, and part-time employment. Aid is awarded on the basis of academic achievement and demonstrated financial need.

In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade-point average for particular awards and are not financially encumbered by any other University office. All undergraduate gift aid (institutional scholarships and grants and federal grants) requires that the student be working on the first undergraduate degree. Undergraduate gift aid and all federal aid require that the recipient be registered for a full-time course load at GW.

Entering students intending to apply for financial aid should submit the completed financial aid application and the application for admission by February 1; all applications for financial aid must be filed by that date regardless of whether the student has been admitted yet. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Complete information on financial assistance and the necessary application materials are available from the Office of Student Financial Assistance, George Washington University, Washington, D.C. 20052.

#### *Programs Leading to the Associate in Science*

Satisfactory completion of a minimum of 60 credit hours of course work is required for the degree of Associate in Science; some programs, however, may set requirements above the minimum. See individual program descriptions for information on course distribution.

Students who may wish to pursue a bachelor's degree later are advised to plan their associate's degree program so that, where possible, they will satisfy the prerequisites of the baccalaureate.

#### *Scholarship Requirements*

A minimum cumulative grade-point average of 2.0 is required in course work leading to the degree of Associate in Science. A minimum cumulative grade-point average of 2.5 is required for course work in the core curriculum. A student whose grade-point average in the core curriculum falls below 2.5 in any one semester will receive a warning letter.

#### *Residence Requirement*

A minimum of 18 credit hours of course work in the major must be satisfactorily completed in residence at the School of Medicine and Health Sciences.

### Medical Laboratory Technique Program

The program of study leading to the degree of Associate in Science with a major in medical laboratory technique is offered only to off-campus military students

#### *Admission to Degree Candidacy*

General requirements for admission to degree candidacy are stated on pages 44-47. Students who do not meet these requirements may be considered for admission to degree candidacy upon satisfactory completion of a probationary period of 15 credit hours of course work taken in residence at George Washington University, with a minimum grade-point average of 2.5, or upon completion of 15 credit hours of acceptable (2.5) and transferable course work

#### *Degree Requirements*

The program requires satisfactory completion of a minimum of 61 credit hours of course work, distributed as follows

*General Curriculum Requirements*—6 credit hours of English composition (Engl 9 or 10 and 11, or equivalent), 6 credit hours of college math or 3 credit hours of college math and a humanities or social science elective, and 4 credit hours of general chemistry (Chem 11 or equivalent).

*Courses in the Major*—Path 13, 14, 15, 16, 17, 18, 19, 20. This requirement is fulfilled by successful completion of Medical Laboratory Technique School (NEC 8506)

### Nuclear Medicine Technology Program

The program of study leading to the degree of Associate in Science with a major in nuclear medicine technology is offered to on-campus students and to off-campus military students

#### *Admission to Degree Candidacy*

General requirements for admission to degree candidacy are stated on pages 44-47. Applicants must be at least 18 years of age by the time they first register in the program. Two letters of recommendation must be sent directly from previous instructors, advisors, or employers. Completed applications must be received by April 30. The selection process includes a personal interview for qualified applicants. Enrollment is limited. Students who do not meet the standard requirements may be considered for admission to degree candidacy upon satisfactory completion of a probationary period of 15 credit hours of course work taken in residence at George Washington University, with a minimum grade-point average of 2.5, or upon completion of 15 credit hours of acceptable (2.5) and transferable course work

#### *Degree Requirements*

Satisfactory completion of 68 credit hours of course work is required. Anat 115, Chem 11-12, Phyl 111, and Phys 1, or their equivalents, are prerequisite to all courses in nuclear medicine technology.

*General Curriculum Requirements*—6 credit hours of English composition (Engl 9 or 10 and 11, or the equivalent), 3 credit hours of general psychology, and 3 credit hours of humanities.

*Courses in the Major*—Rad 10, 43, 44-45-46, 55-56, 59, 66, 73, 74, 130, 172, 190. For off-campus military students, this requirement is fulfilled by successful completion of Nuclear Medicine Technology School (NEC 8416)



### Prehospital Clinical Medicine Program

The program of study leads to the degree of Associate in Science with a major in prehospital clinical medicine.

#### Admission to Degree Candidacy

General requirements for admission to degree candidacy are stated on pages 44-47. In addition, students must submit completed applications and the following records directly to the GW Office of Admissions by July 30:

1. Photocopies of scores or certificates from national registry examinations or certifying boards (where applicable).
2. Verification of satisfactory completion of prehospital clinical training and proof of current participation in an emergency medical services system (where applicable).
3. Two letters of recommendation from previous instructors, advisors, or employers involved in emergency medical services.

A personal interview may be required. Students admitted to the program must submit, before the first day of class, a letter from a physician attesting to their good health. The letter should include the results of testing for tuberculosis and a statement of current immunization status. Applicants who do not meet the academic requirements for admission to degree candidacy may reapply after satisfactory completion of a 15-credit-hour probationary period completed in residence at the George Washington University School of Medicine and Health Sciences.

#### Advanced Standing

General provisions for advanced standing are listed on pages 46-47. Advanced standing may be granted for satisfactory completion of certificate-level course work in prehospital emergency care, after the candidate submits official transcripts or records from an accredited, certificate-granting medical facility. Advanced standing may also be earned for special departmental examinations passed at specified levels.

#### Degree Requirements

The program requires satisfactory completion of a minimum of 60 credit hours of course work, distributed as follows:

**General Curriculum Requirements**—18 credit hours, including 6 hours of English (Engl 9 or 10 and 11), 3 hours of psychology or sociology, Mgt 110, Educ 180, and Stat 51.

**Courses in the Major**—EMed 10, 18, 61, 62, 63, 64, 65, 66, and 6 hours of program electives.

### Radiation Therapy Technology Program

The program of study leads to the degree of Associate in Science with a major in radiation therapy technology.

#### Admission to Degree Candidacy

General requirements for admission to degree candidacy are stated on pages 44-47. Applicants must be 18 years of age by the time they first register in the program. Two letters of recommendation must be sent directly from previous instructors, advisors, or employers. Completed applications must be received by April 30. The selection process includes a personal interview for qualified applicants. Enrollment is limited. Applicants who do not meet the standard requirements may be considered for admission to degree candidacy upon satisfactory completion of a probationary period of 15 credit hours of course work taken in residence at George Washington University, with a minimum grade-point average of 2.5.

### **Degree Requirements**

Satisfactory completion of at least 64 credit hours of course work is required for the Associate in Science degree, distributed as follows.

*General Curriculum Requirements*—6 credit hours of English composition (Engl 9 or 10 and 11, or the equivalent)

*Courses in the Major*—Anat 115; HCS 116; Phyl 111; Rad 10, 11, 12, 14, 16–17–18, 19, 20–21, 23 (7 hours), 24, 25, 33, 115, 130, 190. (Phys 1 may be substituted for Rad 14.)

### **Radiologic Technology Program**

The program of study leading to the degree of Associate in Science with a major in radiologic technology is offered only to off-campus military students

#### **Admission to Degree Candidacy**

General requirements for admission to degree candidacy are stated on pages 44–47. Students who do not meet the standard requirements may be considered for admission to degree candidacy after satisfactory completion of a probationary period of 15 credit hours of course work taken in residence at GW, with a minimum grade point average of 2.5, or upon completion of 15 credit hours of acceptable (2.5) and transferable course work.

### **Degree Requirements**

The program requires satisfactory completion of 62 credit hours of course work, distributed as follows:

*General Curriculum Requirements*—6 credit hours of English composition (Engl 9 or 10 and 11 or 12, or the equivalent), 3 credit hours of social science, and 3 credit hours of humanities.

*Courses in the Major*—Rad 40–41–42, 50, 51, 60, 61, 62, 70, 71, 80, 90, 95, 96, 97, 99, 100. This requirement is fulfilled by successful completion of Radiologic Technology School (NEC 8452).

### **Programs Leading to the Bachelor of Science in Health Science**

The Bachelor of Science in Health Science degree programs are offered only to off-campus military students

### **Advanced Hospital Corps School Program**

Degree requirements are as follows:

*General Curriculum Requirements*—30 credit hours, including 6 hours in English composition, 3 hours in general psychology, and 21 hours in the humanities and social sciences, 18 hours, including HCS 10, 15, and 16 and an additional 3 hours selected from the following areas: biological and physical sciences, mathematics, computer science, hospital administration, industrial hygiene, public health organization and administration, and environmental science. This requirement is fulfilled by successful completion of Advanced Hospital Corps School (NEC 8425).

*Courses in the Major*—72 credit hours, consisting of HCS 22, 54, 67, 68, 75, 83, 87, 92, 93, 96, 102, 126, 133, 175, and 180 (a corresponding number of credits for approved course work in the area of subject competence may be substituted for HCS 175 and 180).



## Nuclear Undersea Medical Technology Program

Degree requirements are as follows

*General Curriculum Requirements*—30 credit hours, including 6 hours in English composition (Engl 9 or 10 and 11), 3 hours in general psychology, and 21 hours in humanities and social sciences, 15 hours, consisting of HCS 15, 16, 20, and 21. (The HCS requirements are fulfilled by successful completion of NEC 8402.)

*Courses in the Major*—77 credit hours, including HCS 26, 66, 90, 93, 96, and 133 (this requirement is fulfilled by successful completion of NEC 8402) and an additional 9 hours in biological sciences, chemistry, computer science, emergency medical technology, environmental studies, geology, health science, industrial hygiene, physics, public health, or statistics.

## Programs Leading to the Bachelor of Science

Satisfactory completion of a minimum of 120 credit hours of course work is required for the Bachelor of Science degree; some programs, however, may set requirements above the minimum. See individual program descriptions for information on course distribution.

### Scholarship Requirements

A minimum cumulative grade-point average of 2.0 is required for course work in programs leading to the Bachelor of Science degree. A minimum cumulative grade-point average of 2.5 is required in core-curriculum courses. A student whose grade-point average in the core curriculum falls below 2.5 in any one semester will receive a warning letter.

## Emergency Medical Services Program

This program is designed for individuals interested in emergency medical services and emergency management. The program includes course work in the liberal arts, education, management, and occupational health and safety.

### Admission to Degree Candidacy

The general requirements for admission to degree candidacy are stated on pages 44–47. In addition, students applying to the program must submit completed applications, including the following records, by July 30 directly to the GW Office of Admissions:

1. Verification of satisfactory completion of prehospital clinical training and proof of current participation in an emergency medical services system (where applicable).
  2. Photocopies of scores or certificates from national registry examinations or certifying board examinations (where applicable).
  3. Two letters of recommendation, sent directly to the Office of Admissions by instructors familiar with the applicant's academic preparation or colleagues familiar with the applicant's health care experience.
- A personal interview may be required. Students admitted to the program must submit, before the first day of class, a letter from a physician attesting to their good health. The letter should include the results of testing for tuberculosis and a statement of current immunization status.

### Advanced Standing

General provisions for advanced standing are listed on pages 46–47. In addition, students may receive up to 60 credit hours of advanced standing for satisfactory

completion of required course work at other accredited academic institutions. The program director reserves the right to refuse transfer credit in part or in whole.

### ***Degree Requirements***

The program requires satisfactory completion of a minimum of 123 credit hours of course work, distributed as follows:

***General Curriculum Requirements***—A minimum of 75 credit hours, including English composition, communications, mathematics, biological sciences, statistics, accountancy, psychology or sociology, business administration, personnel management, and computer science. EMed 10, 18, 20, 30, 40, 50, 55, 140, 141, 160, and 200.

***Courses in the Major***—48 credit hours, including 36 hours in one of the following areas of concentration: education, management, safety and occupational health, or prehospital clinical medicine. The remaining 12 hours may be satisfied by electives in emergency medicine or other disciplines.

### ***Residence Requirement***

A minimum of 30 credit hours of course work in the major must be satisfactorily completed in residence at the School of Medicine and Health Sciences.

## **Medical Technology Program**

### ***Admission and Applications***

Application forms for admission to the first three years of the program, as outlined under Degree Requirements, below, are available from the Office of Admissions, George Washington University, Washington, D.C. 20052.

Completion of the first three years of the program does not guarantee acceptance into the senior (clinical) year conducted at the University Hospital, although GW students are given preference. Students must have maintained a grade point average of 2.0 during the first three years to be considered for admission to the clinical year. Applicants will also be evaluated on the basis of academic achievement in the sciences, personal interviews, and letters of recommendation.

Students should apply for admission to the clinical year during their junior year; application is made to the Director, Medical Technology Program, 2300 I Street, N.W., Washington, D.C. 20037. Admission interviews take place between December and March.

### ***Degree Requirements***

The program requires satisfactory completion of 124 credit hours of course work, distributed as outlined below:

#### ***First Three Years***

***English***—6 credit hours: Engl 9 or 10 and 11.

***Humanities and Social Sciences***—12 credit hours, consisting of one 6-hour combination each from two of the following categories:

***Social and Behavioral Sciences***: Anth 2, 3, and 4; Anth 2 and 150; Econ 11–12; Geog 1 and 2; PSc 1 and 2; PSc 3–4; Psyc 1 and 8; Soc 1 and 2.

***Literature***: Chin 103–64; Chin 181–82; Clas 107 and 108; Engl 51–52; Engl 61–62; Engl 71–72; Fren 53 and 54; Ger 51–52; Ger 103–4; Ger 112 and 114; Japn 111–12; Rel 9–10; Slav 91–92; Span 53 and 54; Span 55 and 56.

***Western Society and Civilization***: AmCv 71–72; Art 31–32; Clas 71–72; Hist 39–40; Hist 71–72; Hmn 1–2; Phil 51–52; Rel 1–2.

***Mathematics and Sciences***—39 credit hours: BiSc 11–12, 137; 4 hours selected from BiSc 107–8, 114, 118, 122–23, 124, 132, 139; Chem 11–12, 22, 23, 50; Math 50; Mctr 129.

***Electives***—33 credit hours



**Senior Year**—Path 121, 122, 123, 124, 125, 126, 130, 131, 132, 133; Bioc 111. The pathology courses in the senior (clinical) year constitute the core curriculum, and students must have a minimum cumulative grade-point average of 2.5 in these courses to graduate. Path 121 is a prerequisite to all other courses in the core curriculum. Students who fail this course will not be allowed to continue in the clinical year. They may, however, apply for readmission to the program and will be subject to the requirements and regulations then in force.

### **Residence Requirement**

A minimum of 34 credit hours must be completed in residence. This requirement is met through satisfactory completion of the senior year of the program, conducted at the University Hospital.

### **Nursing Anesthesia Program**

#### **Admission to Degree Candidacy**

General requirements for admission are stated on pages 44-47. In addition, an applicant to the nursing anesthesia program must fulfill the following prerequisites to be considered for admission:

1. Have completed successfully high school or college-level mathematics (general mathematics or algebra) and two semesters of college-level general chemistry (Chem 11-12 or equivalent).
2. Be a graduate of a state-approved school of nursing, be a licensed registered nurse in at least one state, U.S. trust territory, or the District of Columbia, and have a minimum of 12 months of practical experience in critical-care nursing.
3. Be selected for admission to the school of anesthesia at an affiliated hospital before applying to the program at George Washington University. At present, the program has affiliations only with naval hospitals, and applicants must be recommended by the Navy for participation.

Students who graduated from nursing school more than five years ago and have not been active in the nursing profession during the last five years may be required to take National League of Nursing or New York State Board of Regents examinations.

#### **Advanced Standing**

The general provisions for advanced standing are stated on pages 46-47. In addition, advanced standing will be awarded to students in the nursing anesthesia program as follows:

1. Students who are graduates of two- or three-year nursing school programs and have had a minimum of 12 months of practical experience in critical-care nursing may receive up to 45 hours of credit applicable toward the general curriculum requirements.
2. Students who have earned a B.S. degree in nursing may receive up to 60 hours of credit applicable toward general curriculum requirements.
3. Certified Registered Nurse Anesthetists (CRNAs) may petition for advanced standing and waiver of the clinical requirement on the basis of previous anesthesia work experience. They must demonstrate clinical competence before such petitions will be granted.

#### **Degree Requirements**

The program requires satisfactory completion of a minimum of 124 credit hours of course work, distributed as follows:

**General Curriculum Requirements**—30 credit hours, including 6 hours in English composition (Engl 9 or 10 and 11), 3 hours in psychology, and 21 hours in the humanities, social sciences, or mathematics (algebra, geometry, trigonometry, and

calculus). 30 credit hours of course work in the biological, physical, natural, and nursing sciences.

*Courses in the Major*—64 credit hours, consisting of the following.

*Year 1* Anat 115, Anes 191, 198, Bioc 111, HCS 134, Phar 110–11, 124–26, Phyl 111

*Year 2:* Anes 193–94, 195–96

All students must complete Year 1 (the core curriculum) in residence, with a minimum cumulative grade-point average of 2.5. CRNAs may petition to waive Year 2 course work on the basis of successful completion of the core curriculum, demonstrated clinical competence, and satisfactory completion of an oral or written examination in the area of clinical anesthesia. The petition must be submitted to the assistant dean, through the program director, for approval.

### **Scholarship Requirements**

Students who do not maintain a cumulative grade-point average of 2.5 in nursing anesthesia courses taken in the first two semesters may be required to take additional course work in order to achieve this minimum average.

### **Residence Requirement**

A minimum of 31 credit hours of course work in the major must be completed in residence at the School of Medicine and Health Sciences.

### **Physician Assistant Program**

The program is available to on-campus students and off-campus military students.

### **Admission to Degree Candidacy**

The general requirements for admission to degree candidacy are stated on pages 44–47. In addition, applicants must submit evidence that they have satisfactorily completed a minimum of 30 credit hours of college credit, including two semesters of general chemistry for science majors (biochemistry is recommended), two semesters of psychology (general and abnormal psychology are recommended), and two semesters of biological sciences (recommended courses in the biological sciences include human anatomy, physiology, and general microbiology; botany is not acceptable). Direct patient care experience is strongly preferred but not required. Two evaluation forms, submitted directly by the evaluators, and a personal interview are required as part of the admission process (not applicable to off-campus military students).

### **Advanced Standing**

Advanced standing will not be granted toward courses in the major; advanced standing toward the baccalaureate, however, may be awarded for appropriate course work previously completed at other accredited institutions with a minimum grade of C.

### **Degree Requirements**

On-campus students must satisfactorily complete the following course work:

*General Curriculum Requirements*—30 credit hours, including 6 hours in English composition (Engl 9 or 10 and 11 or 12) and 24 hours of course work selected from the humanities, social sciences, or mathematics.

*Courses in the Major*—100 credit hours, consisting of the following (courses in the core curriculum are indicated by an asterisk).

*Basic Science Curriculum:* Anat 115; Bioc 111; Micr 128, Path 127, 128, 152, Phyl 111



*Clinical Sciences:* HCS 109, 125,\* 134,\* 140, 145, 146, 147, 148, 193, Phar 158 (or 159 and 160)

*Clinical Rotations:* HCS 160,\* 163,\* 166, 169, 172,\* 175,\* 178, 198

*Clinical Electives.* Two clinical electives must be chosen from the following list—HCS 158, 159, 176, 177, 186, 187, 188, 199.

*Other Required Courses:* HCS 113, 115, 116, 119, 137

### **Scholarship Requirements**

Students in the Physician Assistant Program are required to maintain a minimum grade of *C* in all course work, in both the academic and clinical phases of the program. A grade below *C* in any academic course or clinical rotation is grounds for academic dismissal.

A student who fails to attain at least a *C* in any course, and who wishes to continue in the program, must submit a petition in writing to the program director, requesting permission to remain in the program. If approved by the assistant dean and the program director, the student may continue in the program, subject to conditions that have been specified for remediation of the academic deficiency, including standards for performance.

Deficient performance in a course in the academic phase of the program, will ordinarily involve repeating the course. At the discretion of the Assistant Dean, however, the student may be allowed to enroll in other courses during the academic phase, while remedying the deficiency. No student, however, may proceed from the academic to the clinical phase of the program until all academic deficiencies have been successfully remedied.

If a student's petition to continue in the program is denied, the student may appeal this decision to the Dean for Academic Affairs who may seek the advice of the Committee on Health Science Programs before reaching a decision.

**Part-Time Students**—Students enrolled in the part-time Physician Assistant Program are governed by the same academic policies as full-time students with the exception that, when a part-time student's cumulative grade-point average falls below 2.0, the student will be placed on academic probation, which extends over the period in which the student next attempts 6 credit hours of course work.

### **Residence Requirement**

Generally, a minimum of 75 credit hours in the preclinical and clinical portions of the major must be completed in residence at the School of Medicine and Health Sciences. Under special circumstances, exceptions to the minimum residence requirement may be allowed.

### **Off-Campus Military Program**

Currently open only to active-duty Navy personnel.

#### **Application**

Application packages for the Off-Campus Navy Physician Assistant Program are submitted to the Naval Medical Personnel Command (NMPC). Applicants to the Off-Campus Physician Assistant Program are initially screened by GW's Educational Qualification Review Board for academic eligibility.

Applicants who meet academic requirements are referred to the NMPC Selection Board for admissibility to the program.

### **Admission Requirements**

Applicants must submit evidence that they have completed a minimum of 60 credit hours of course work and be degree eligible upon completion of the two-year Navy PA Program. Course work must be completed with a minimum grade of *C* and must

include the following: English composition—6 hours; humanities social sciences—24 hours, and basic sciences—30 hours, including two semesters each of chemistry, biological sciences, and psychology. The basic science requirement may be fulfilled by completion of Advanced Hospital Corps School (NEC 8425) or Naval Undersea Medical Technology School (NEC 8402).

### **Program Curriculum**

*Health Sciences*—HCS 83, 111, 112, 114, 116, 120, 121, 151

*Clinical Sciences*—HCS 109, 126, 127, 128, 129, 130, 134, 137, 140, 147, 148, 190

*Clinical Rotations*—HCS 159, 161, 163, 166, 168, 169, 172, 177, 178, 189, 191, 192, 195, 198.

All course work in the major curriculum must be completed with a grade-point average of at least 2.5 on a 4.0 scale.

### **Radiological Sciences and Administration Program**

This program is designed for registered technologists in diagnostic radiologic technology, nuclear medicine technology, ultrasound, or radiation therapy technology who wish to continue their education at the baccalaureate level.

#### **Admission to Degree Candidacy**

The general requirements for admission to degree candidacy are stated on pages 44–47. In addition, students applying to the program must be registered technologists or registry eligible within the first semester of study at George Washington University. Two letters of recommendation (submitted directly by previous instructors, advisors, or employers) and a personal interview are required. Completed applications must be received by April 30.

#### **Advanced Standing**

General provisions for advanced standing are listed on pages 46–47. In addition, students may receive up to 48 credit hours of credit applicable toward fulfillment of the subject competence requirements under the following conditions:

1. If their technical training was completed within the last five years and they maintained a minimum grade-point average of 2.5 or an average of 80% in a program accredited by the Joint Review Committee on Educational Programs in Radiologic Technology, Diagnostic Ultrasound, Nuclear Medicine Technology, or Radiation Therapy Technology of the Council on Medical Education of the American Medical Association.
2. If they have been certified as an American registered radiologic technologist, nuclear medicine technologist, diagnostic medical sonographer, or radiation therapy technologist.
3. If they become registry-eligible during the first semester of study at George Washington University.

#### **Degree Requirements**

The program requires satisfactory completion of 122 credit hours of course work distributed as follows:

*General Curriculum Requirements*—A minimum of 27 credit hours, including Engl 9 or 10 and 11, Psyc 1, Mgt 110, SMPP 191, CSci 10, and 9 hours of electives from the humanities and social sciences. Recommended electives include Comm 1, Econ 11–12.

*Courses in the Major*—A total of 92 credit hours, including Rad 130, 140, 145, 160, and 195, two electives selected from Rad 115, 167, 172, and 196, Stat 51, Accy 51, 52, HSMP 203, and 12 hours of electives selected with permission of the advisor.



**Residence Requirement**

A minimum of 30 credit hours of course work in the major must be completed in residence at the School of Medicine and Health Sciences.

**Certificate Programs****Certificate in Medical Technology**

Students who have already earned the bachelor's degree from an accredited institution and have completed course work comparable to that required in the first three years of the medical technology degree program (see above) may apply for admission to the clinical year. Upon successful completion of this program of study, they will be awarded a certificate in medical technology.

In addition to completing the application for the clinical year, applicants to the certificate program must have official copies of all college transcripts sent to the director of the medical technology program. Three letters of recommendation are also required, two from science instructors and one from a faculty advisor or employer.

Applicants who have received their education from a university outside the United States must have their transcripts evaluated by one of the foreign transcript evaluation agencies. A list of acceptable evaluation agencies may be obtained from the program director. A copy of this evaluation should be sent with the other required documents.

**Certificate in Nuclear Medicine Technology**

Admission to the certificate program in nuclear medicine technology is open to students who hold associate's or bachelor's degrees and have completed college-level course work in anatomy and physiology, general chemistry, and general physics as well as 6 credit hours of English composition. The program requires satisfactory completion of at least 37 credit hours of course work, including Rad 10, 43, 44, 45, 46, 55-56, 59, 66, 73, 74, 130, 172, and 190.

Application forms for the certificate program are available from the Radiological Health Sciences Programs Office, 2300 I Street, N.W., Washington, D.C. 20037. The deadline for return of completed applications is April 30.

**Post-Master's Nurse Practitioner Certificate****Admission Requirements**

To be considered for admission to the nurse practitioner certificate program, an applicant must (1) have an M.S.N. from an accredited school of nursing, (2) have a minimum grade-point average of 3.0 (out of 4.0) from the M.S.N. degree program, and (3) have practiced nursing during the two-year period before seeking admission to the program.

Three letters of recommendation must be sent directly from evaluators. At least one must be from a supervisor, the remainder may be submitted by present or former instructors or by colleagues familiar with the applicant's health care experience.

**Program Requirements**

Students must successfully complete the following courses to be eligible to take the American Nurses Association's Adult Nurse Practitioner certification examination: WLS 125, 140, 175, and Phar 158.

Students must also complete a 450-hour preceptorship that has been individually designed from the following courses: HCS 153, 154, 157, 165, 170, 177, and 179.

In addition, students who wish to take the American Nurses Association's Gerontologic Nurse Practitioner certification examination may elect the following courses in gerontology: HCS 193 and either Gern 201 or Soc 280 and HCS 154 (as part of the 450-hour preceptorship).

The courses for the adult and gerontologic nurse practitioner certificate may be taken on a full-time or part-time basis.

### Physician Assistant Certificate

The post-baccalaureate program leading to the physician assistant certificate is available only to those students who are also pursuing the Master of Public Health degree (see page 40). To be considered for admission to this component of the combined Physician Assistant-M.P.H. program, applicants must have a bachelor's degree from an accredited college or university and must meet the requirements for admission to degree candidacy in the physician assistant program (see above). The program of studies for the certificate consists of the required courses in the major for the Physician Assistant degree program. Application forms for the combined program are available from the MPH Admissions Office, GW School of Medicine and Health Sciences, Box 32, 2300 I Street, N.W., Washington, D.C. 20037.

### Certificate in Radiation Therapy Technology

Admission to the certificate program in radiation therapy technology is open to ARRT-registered or registry-eligible graduates of an accredited radiologic technology program. Nurses and other health sciences professionals are also eligible for admission if they have taken relevant physics courses prior to application. The program requires satisfactory completion of at least 36 credit hours of course work including Rad 11, 12, 16-17, 18, 19, 20-21, 23 (9 hours), 24, 25, 130, and 190.

Application forms for the certificate program are available from the Radiological Health Sciences Programs Office, 2300 I Street, N.W., Washington, D.C. 20037. The deadline for return of completed applications is April 30.

### Courses Offered by Other Divisions of the University

Students should consult their academic advisors for information about required courses that are offered by Columbian College of Arts and Sciences or by the School of Business and Public Management. The program coordinators in the Office of Health Sciences Programs Administration will provide assistance in choosing electives appropriate for the student's program. These may be selected from a range of offerings in the humanities, mathematics, and social sciences; see the University's *Undergraduate Programs Bulletin* for complete course descriptions.

Off-campus students should consult the appropriate program coordinator for assistance in selecting electives and required courses at other institutions.



## Courses of Instruction

Courses are subject to change. The University reserves the right to withdraw any course announced. The staff of instruction listed by department at the back of this *Bulletin* is current as of Fall 1990.

### Explanation of Course Numbers and Symbols

Courses numbered 1-200 are for students in undergraduate health sciences programs. Courses in the basic science departments numbered 201-400 are for candidates for the M.D. degree and for students in the Graduate School of Arts and Sciences. All other courses numbered from 201 to the 800s are primarily for candidates for the M.D. degree unless otherwise stated.

A number in parentheses after the name of the course indicates the number of credit hours that may be earned. Five credit hours of credit per four-week elective period are granted for all fourth-year courses in the M.D. program.

### Key to Abbreviations

The following abbreviations are used for course designations

Accy	Accountancy	Geob	Geobiology
AdSc	Administrative Sciences	Geog	Geography and Regional Science
AmCiv	American Civilization	Geol	Geology
Anat	Anatomy	Ger	Germanic Languages and Literatures
Anes	Anesthesiology	Gern	Gerontology
Anth	Anthropology	HCS	Health Care Sciences
ApSc	Applied Science	HSMP	Health Services Management and Policy
Art	Art	Hist	History
ArTh	Art Therapy	Honr	Honors
AM	Association Management	HmKn	Human Kinetics
Bloc	Biochemistry and Molecular Biology	HRD	Human Resource Development
BSc	Biological Sciences	HmSr	Human Services
Chem	Chemistry	Hmn	Humanities
Chin	Chinese	Idis	Interdisciplinary Courses
CE	Civil Engineering	IAff	International Affairs
Clas	Classics	IBus	International Business
Comm	Communication	Ital	Italian
CpMd	Computer Medicine	Japn	Japanese
CScl	Computer Science	Jour	Journalism
Coal	Counseling	Kor	Korean
Derm	Dermatology	Law	Law
Econ	Economics	Ling	Linguistics
Educ	Educational Leadership	Mgt	Management Science
EE	Electrical Engineering	MIOM	Marketing Logistics and Operations Management
EMed	Emergency Medicine	Math	Mathematics
EMgt	Engineering Management	ME	Mechanical Engineering
EngS	Engineering Science	Med	Medicine
Engl	English	Mier	Microbiology and Immunology
FFL	English as a Foreign Language	MStd	Museum Studies
E&RP	Environmental and Resource Policy	Mus	Music
EnHe	Environmental Health	NSc	Naval Science
Envr	Environmental Studies	NSur	Neurological Surgery
ExSA	Exercise and Sport Activities	Neur	Neurology
Fina	Finance	Ob&G	Obstetrics and Gynecology
ForS	Forensic Sciences	ORL	Operations Research
Fren	French		
Gnet	Genetics		

Ophth	Ophthalmology	SLP	Service-Learning Program
Orth	Orthopaedic Surgery	Slav	Slavic Languages and Literatures
Path	Pathology	Soc	Sociology
Peds	Pediatrics	Span	Spanish
Phar	Pharmacology	SpEd	Special Education
Phil	Philosophy	SpHr	Speech and Hearing
Phys	Physics	Stat	Statistics/Computer and Information Systems
Phyl	Physiology	SMPP	Strategic Management and Public Policy
PCm	Political Communication	Surg	Surgery
PPsy	Political Psychology	TrEd	Teacher Education
PSc	Political Science	TCom	Telecommunication
Port	Portuguese	TrDa	Theatre and Dance
Pchl	Psychiatry and Behavioral Sciences	T&T	Travel and Tourism
Psyc	Psychology	Univ	University
PAd	Public Administration	UPRE	Urban Planning and Real Estate Development
PubH	Public Health	Urol	Urology
PPol	Public Policy	WStu	Women's Studies
Rad	Radiology		
Rel	Religion		
Rom	Romance Literatures		
Rmn	Romanian		

## Anatomy

*Acting Chair R.J. Walsh*

- 115 **Anatomy for Health Sciences Students (4)**  
Gross and microscopic structure of the human body, including musculoskeletal, nervous, endocrine, cardiovascular, respiratory, gastrointestinal, urinary, and reproductive systems. Laboratory work is limited to prosected anatomical demonstrations. Staff
- 213 **Gross Anatomy (6)**  
Required for medical students. Staff
- 214 **Microscopic Anatomy (3)**  
Required for medical students. Staff
- 215 **Human Developmental Anatomy (1)**  
Required for medical students. Staff
- 252 **Physical Anthropology (1)**  
Variations in humans and factors affecting them, human evolution and racial differences, anatomy and culture of ancient humans. Ubelaker
- 262 **Gross Anatomy of Upper and Lower Extremities (2)**  
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, \$10. Slab
- 264 **Gross Anatomy of Head and Neck (2)**  
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, \$10. Slab
- 266 **Gross Anatomy of Thorax and Abdomen (2)**  
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, \$10. Slab
- 268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity (2)**  
Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee for nonmedical students, \$10. Slab
- 276 **Advanced Studies in Anatomy (1)**  
Selected anatomical subspecialties—endocrinology, teratology, growth, and others. May be repeated for credit. Staff
- 279 **Applied Regional Anatomy (arr.)**  
Regional dissection, assigned reading, discussions. Staff
- 284 **Applied Surface Anatomy and Radiology (5)**  
Detailed study of anatomical structures that are accessible to examination in the living subject; normal radiology of the body. Four week elective periods (Spring). Staff



- 288 **Surface Anatomy and Radiology (1)** Slaby  
Lectures on areas of clinical importance.
- 291 **Special Projects in Anatomy (arr.)** Slaby  
Independent study of any aspect of gross anatomy.
- 295 **Research (arr.)** Staff  
Content differs each time course is offered; may be repeated once for credit. Fee to be arranged.
- 501 **Didactic Anatomy (3)** Staff  
Development of a didactic program to include human developmental anatomy, microscopic anatomy, gross anatomy, and where appropriate, neuroanatomy. May also include interdepartmental study. Topics may include anatomy of the special senses; functional morphology of the endocrine system; structure and functional anatomy of the mammary gland at different ages in both sexes; functional anatomy of the respiratory system, including a study of the bronchopulmonary segments, the urinary system, the heart, the autonomic nervous system, the lymphatic system, the female or male reproductive system, peripheral nerves and peripheral nerve lesions; functional anatomy of bones and joints, the pregnant uterus, the structural and functional anatomy of the stomach, duodenum, and colon.
- 800 **Summer Remedial: Gross Anatomy (6)** Staff
- 801 **Summer Remedial: Microscopic Anatomy (3)** Staff
- 802 **Summer Remedial: Human Developmental Anatomy (1)** Staff

## Anesthesiology

Chair B.S. Epstein

Courses numbered 190-198 are open only to degree candidates in the nursing anesthesia program

- 190 **Seminar: Anesthesiology (4)** Staff  
Discussion of morbidity and mortality based on actual and reported cases. Topics related to complications of anesthesia.
- 191 **Respiratory Care (3)** Staff  
Advanced techniques for the care of patients requiring total respiratory support. Same as Phar 191.
- 192 **Orientation for Anesthesia (0)** Staff  
History of anesthesia, legal aspects, ethics, psychology, professional conduct, department management, organization.
- 193-94 **Methods and Procedures in Anesthesia (2-2)** Staff  
At affiliated hospitals. Anesthesia techniques, types of anesthetic required to meet the needs of different surgical specialties, and related topics.
- 195-96 **Principles of Clinical Anesthesia (13-13)** Staff  
Twelve-month course at affiliated hospitals. Supervised clinical training and experience. The student is assigned patients, organizes and administers anesthesia, and follows patients throughout hospitalization. Designed to satisfy the requirements of the American Association of Nurse Anesthetists.
- 198 **Pathological Physiology and Anesthesia (3)** Staff  
Review of pathophysiology of major organ systems in relation to anesthesia. Clinical implications of various disease states, their interactions with anesthetics, and effects on anesthetic management.
- 210 **Cardiovascular Research in Anesthesia (5)** Mergner  
Experience in and observation of the various aspects of laboratory research in anesthesia, particularly research on regional myocardial ischemia in the dog.
- 211 **Diagnostic and Therapeutic Instrumentation (2)** Shaffer  
Introduction to diagnostic and therapeutic instrumentation used in critical care areas of the hospital including the OR, ICU, CCU, and ICN. Methods of operation, problems and new developments in instrumentation.
- 212 **Anesthesiology Research Laboratory (2)** Mergner  
Cardiovascular physiologic changes and measurements resulting from drugs, drug interactions, and anesthetic techniques. Placental transfer and fetal and maternal physiologic changes from toxic local anesthetic reactions. Limited enrollment. Second year only.

- 302 **Required Anesthesiology (3)** Morales and Staff  
Required for senior medical students. Basic physiology and pharmacology as applied to cardiac, respiratory, obstetric, and renal changes incurred during anesthesia. Clinical applications are discussed and demonstrated.
- 380 **Anesthesiology (5)** Morales  
Clinical experience in preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy, and monitoring and blood gas determinations. Four-week elective periods. University Hospital.
- 382 **Neurosurgical Anesthesia (arr.)** Lee  
Principles of clinical management of the neurologic patient in the perioperative period. Physiology and pharmacology of intracranial pressure and cerebral blood flow and metabolism. Monitoring of somatosensory, visual, and auditory evoked responses and intracranial pressure. Effects of respiratory nursing and physical therapy maneuvers on neurosurgical patients. Participation in research projects in operating room and intensive care unit may be possible. University Hospital.
- 384 **Intensive Care Unit (5)** Zimmerman and Staff  
Evaluation and management of respiratory failure, rationale and use of ventilatory airway management, cardiovascular support, and intensive care. Four-week elective periods. University Hospital.
- 386 **Critical Care Medicine (arr.)** Staff  
Management of patients with a wide variety of conditions, both medical and surgical. Common illnesses encountered may include sepsis, renal failure, respiratory failure, ARDS, multiple organ failure, myocardial infarction, and dysrhythmias. Walter Reed Army Medical Center.
- 386 **Critical Care Medicine (arr.)** Staff  
Experience in managing patients with renal failure, shock, respiratory failure, acid-base disorders, and hyperinflation, with emphasis on appropriate use of invasive monitoring, intubation, and ventilatory support.
- 390-92 **Extramural Anesthesiology Elective (arr.)**  
Elective periods at other institutions.

## Biochemistry and Molecular Biology

Chair A.L. Goldstein

- 101 **Chemistry for Health Sciences Students (2)** Staff  
For students in health sciences programs. Basic concepts of general and organic chemistry.
- 111 **Biochemistry for Health Sciences Students (4)** Walker  
For students in health sciences programs. Basic concepts of biochemistry and their relation to health sciences.
- 201 **Medical Biochemistry (8)** Walker and Staff  
Required for medical students. Lecture and laboratory, emphasis on basic principles and their relation to medicine.
- 209 **Research Elective in Medical Biochemistry (arr.)** Walker  
For senior medical students. Research in areas currently under investigation in the department.
- 223 **Physical Biochemistry (3)** Vanderhoeck  
Lectures cover basic laboratory techniques used in contemporary biochemical and molecular biological research.
- 231 **Bioenergetics (2)** Staff  
Biochemical thermodynamics, oxidation-reduction processes, oxidative phosphorylation, photosynthesis, and chemiosmotic energy coupling. Prerequisite: Bioc 201 or 221-22.
- 240 **Nutrition (2)** Walker and Staff  
Discussion of RDA, nitrogen balance, vitamins and minerals, diets, and other special topics. Prerequisite: Bioc 201 or 221-22.
- 264 **Membrane-Associated Complex Lipids (1)** Fishman  
Catabolism and biosynthesis of complex sphingolipids, inherited metabolic diseases associated with abnormal sphingolipid metabolism, membrane receptors for toxins and hormones, and other special topics. Prerequisite: Bioc 221-22.
- 270 **Biochemistry and Cell Biology of the Immune Response (2)** Naylor and Staff  
Biochemical aspects of the immune response at the molecular and cellular level.



Modern experimental approaches to immunology and cell biology. Prerequisite: Bioc 221-22 and Micr 229, or permission of instructor

280 **Neurochemistry (2)** Moody and Staff

Molecular structure and function of nerve tissue, intra- and interneuronal communication mechanisms, biochemistry of various brain dysfunctions, and other special topics. Prerequisite: Bioc 201 or 221-22

290-91 **Extramural Biochemistry Elective (arr.)**

Elective periods at other institutions

295 **Research in Biochemistry (arr.)** Staff

Participation in a project under investigation in the department or one in a related field suggested by the student and approved by the staff. Content differs each time course is offered. May be repeated for credit.

502 **Molecular Biology of Oncogenes (arr.)** Kumar

Directed readings on current research work in recombinant DNA and the application of gene cloning in the understanding of selected clinical disorders

503 **Readings in Immunology (3)** Goldstein

Directed readings in immunochemistry, immunobiology, tumor immunology, and basic and clinical cellular immunology. May be repeated for credit

800 **Summer Remedial: Biochemistry (8)**

## Computer Medicine

*Interim Chair* T.E. Piemme

201 **Theory of Medicine (1)** Yamamoto

Theoretical constructs implicit in the practice of medicine, with emphasis on decision theory. Other topics include the nature, origin, and organization of medical knowledge, focusing on statistical reasoning

252 **Introduction to Interactive Computing (1)** Orthner and Staff

Introduction to PC-based interactive computing and software packages for applications such as word processing, spreadsheets, database management, telecommunications, and electronic mail. Basic elements of computer programming. Successful completion of this course will satisfy the medical computing competency requirements for first- and second-year medical students. Enrollment limited. Open to nonmedical students with permission of instructor.

253 **Medical Computing (1)** Yamamoto

Aspects of computer use, including preparation and execution of programs that involve clinical or research applications, such as ECG analysis, medical file management, mathematical modeling, and managerial computing

353 **Medical Computing (arr.)** Yamamoto, Orthner

For senior medical students. Aspects of computer use, including preparation and execution of programs that involve clinical or research applications, such as ECG analysis, pulmonary function calculation, medical file management, mathematical modeling, data processing, and managerial computing. Tutorial or classroom instruction, depending on enrollment.

390-91 **Extramural Computer Medicine Elective (arr.)**

Elective periods at other institutions.

502 **Mathematical Models and Decision Theory (3)** Yamamoto

For senior medical students. Systematic review of mathematical and computational approaches to medical decision analysis and representations of biomedical information. Models deal with physiological systems in heuristic and decision algorithms and with formulation of medical information for automated diagnosis and prognosis. Students should have some background in probability and differential equations and must complete a project involving computers. Warwick Building

## Dermatology

*Chair* M.L. Elgart

380 **Dermatology Clinic (arr.)** Elgart and Staff

Conferences, lectures, and attendance at dermatology clinic. Diagnosis and treatment of common skin disorders, dermatologic surgical procedures, technique for

using liquid nitrogen, culture and identification of fungi, microscopic diagnosis of common cutaneous diseases. Medical Faculty Associates.

381 **Dermatology Clinic (arr.)**

Same as Derm 380. Group Health Association.

382 **Dermatology Clinic (arr.)**

Same as Derm 380. Walter Reed Army Medical Center.

385 **Dermatology in General Medicine (arr.)**

Outpatient clinic two mornings a week; daily rounds on the inpatient and consultation services; consultations on all patients in hospital. Basic science conference and at least three hours of dermatology review slide sessions each week. Advanced readings in dermatology. Supervision by chief resident. Washington Hospital Center.

386 **Private Office Practice (arr.)**

The department arranges for students to work in a private dermatology practice.

387 **Introduction to Dermatopathology (arr.)**

Basic patterns of skin disease and their microscopic manifestations.

390-92 **Extramural Dermatology Elective (arr.)**

Elective periods at other institutions.

## Emergency Medicine

Chair M.S. Smith

10 **Introduction to Prehospital Clinical Medicine (5)**

Explores, through lectures and simulation exercises, the role and responsibilities of the emergency medical technician ambulance (EMT/A). Patient assessment, basic life support, hemorrhage control, bandaging, splinting, and extrication techniques. Observation of emergency care delivery in a local setting. Certification training in cardiopulmonary resuscitation. Upon successful completion, the student is eligible to take the national registry EMT/A examination.

11 **EMT/A Review (2)**

Review of information and skills for the emergency medical technician preparing to take a state recertification examination. Includes CPR certification, FOA, and MAST training. Prerequisite: current EMT/A certification and EMed 10 or equivalent.

12 **Preliminary Emergency Care (2)**

Classroom and laboratory instruction that follows the Department of Transportation's first responder course guidelines. Topics include airway management, CPR, hemorrhage control, bandaging, and splinting. Upon successful completion, the student is eligible to take a state first-responder certification examination.

13 **First-Responder Review (2)**

Review of information and skills for the first-responder preparing to take a state recertification examination. Includes CPR certification. Prerequisite: current first responder certification and EMed 12 or equivalent.

18 **Emergency Medical Services and the Health Care System (3)**

Organization and management of emergency medical services systems. Service delivery methods, the relationship of emergency medical services to the overall health care system, and the roles of federal, state, and local governments and the private sector in delivery of emergency care. Prerequisite: EMed 180 or equivalent.

20 **Management Communication Skills (3)**

Development of skills in report and proposal writing, record keeping, and oral presentation.

30 **Design of Emergency Medical Services Communication Systems (3)**

Introduction to communication networks in the emergency medical services system, including communication systems design, dispatch protocols, triage, and procedures for multiple-casualty incidents.

40 **Management of Emergency Services (3)**

Principles of personnel management and processes that contribute to the effectiveness of an organization. Topics include manpower training and use, resource allocation, vehicular design, and equipment purchase.

50 **Health and Safety Legislation (3)**

Survey of the methods used to develop health and safety legislation, including the roles of federal, state, and local governments. Implications of such legislation for industry, the medical community, and the public.



- 55 **Legal Aspects of Emergency Management (3)** DeAtley  
Legal issues in the delivery of emergency medical services, including abandonment, malpractice, negligence, patient consent, the Freedom of Information and Privacy Acts, the Good Samaritan law, protocol deviation, record keeping, patient refusal of services, and medical control. Emergency medicine legislation and recent court decisions.
- 61 **Prehospital Advanced Life Support I (5)** Staff  
Role and responsibilities of the emergency medical technician/paramedic, including medical history and physical assessment techniques, pathophysiology, and management of shock, cardiac, respiratory, neurological, and gastrointestinal emergencies. Overview of emergency medical services communication systems. Students are assigned to work in local emergency departments and ride with area paramedics. Laboratory sessions in patient assessment, advanced airway management, defibrillation, intravenous techniques, and IM/SC injections. Prerequisite: EMed 10; concurrent registration: EMed 65.
- 62 **Prehospital Advanced Life Support II (5)** Staff  
Assessment and management of emergencies in obstetrics, gynecology, trauma, pediatrics, adolescent medicine, and geriatrics. Prerequisite: EMed 10; concurrent registration: EMed 66.
- 64 **Paramedic Skills I (1)** Staff  
Presentation of trauma management skills outlined in PHILS BILS course. Prerequisite: permission of instructor.
- 64 **Paramedic Skills II (1)** Staff  
Presentation of cardiac emergency management skills outlined in the American Heart Association's ACLS course. Lecture and laboratory. Prerequisite: permission of instructor.
- 65 **Prehospital Clinical Practicum I (9)** Staff  
Students rotate through a variety of clinical sites, including critical care units, operating rooms, renal dialysis departments, and mobile intensive care units. Concurrent registration: EMed 61.
- 65 **Prehospital Clinical Practicum II (9)** Staff  
Students rotate through a variety of clinical sites, including critical care units, burn units, labor and delivery rooms, and mobile intensive care units. Concurrent registration: EMed 62.
- 67 **Extrication and Rescue Techniques (3)** Staff  
Techniques used in gaining access to and evacuating the injured. Vehicular accident extrication, high rise and water rescue, electrical emergencies, and use of ropes.
- 68 **Arrhythmia Recognition for Emergency Clinicians (1)** Warner  
Fundamentals of electrocardiography and interpretation of basic ECG patterns. Common errors in taking and reading ECGs, with emphasis on identification of normal and abnormal wave patterns. Effects of drugs and electrolyte imbalance on ECG patterns.
- 80 **Current Trends and Practices in Prehospital Clinical Medicine (1)** Staff  
Based on a review of monthly video journals, covering such topics as patient assessment techniques, current treatment modalities, disaster medicine, legal issues, and controversies in EMS. Admission by permission of instructor.
- 106 **Educational Planning and Assessment for Emergency Managers (3)** DeAtley  
Theories and principles of learning and teaching, including development of effective course objectives, lecture outlines, and examinations.
- 110 **Stress Management (3)** Schottla  
Impact of stress and burnout on emergency personnel. Causes and effects of stress, short-term stress counseling techniques, effective coping mechanisms, and time-management skills.
- 115 **Emergency Management Information Systems (3)** Staff  
Introduction to the use and application of microcomputers in emergency medical services. Basic programming concepts, comparison of computer-assisted systems, use of microcomputers in inventory control, performance evaluation, and resource allocation. Prerequisite: Educ 180 or equivalent.
- 140-41 **Analysis of Emergency Medical Services Systems (3-3)** Staff  
Planning and evaluation of emergency medical services using various analytical models to examine the components of an emergency medical services system. Prerequisite: EMed 18, 40.

- 150 Disaster Management and Planning (3)**  
Planning for and management of multiple-casualty incidents in the prehospital and hospital environment, including development of response plans, triage, medical evacuation procedures, communications, roles of government and the private sector, terrorism, and medical care for mass gatherings. DeAtley
- 151 Medical Management of Hazardous-Materials Incidents (3)**  
Hazardous materials and their risks. Identification of hazardous materials and related problems, precautions in approaching the contaminated patient, protective clothing, decontamination, and management of selected hazards. Prerequisite: EMed 10 or equivalent. DeAtley
- 160 Financing Emergency Medical Services Systems (3)**  
Designed to provide financial skills needed by managers of emergency medical services systems. Budget planning, preparation, and control, billing and collections, third-party reimbursements, financial reports, financial aspects of grant preparation, responding to RFPs. Prerequisite: Accv 51, EMed 40, SMPP 51. Staff
- 170 Introduction to Safety and Occupational Health (3)**  
Overview of the safety movement. Economic impact of accident-related losses and methods of reducing such losses. Roles of safety and occupational health in minimizing risks and losses. Staff
- 171 Environmental Aspects of Safety and Occupational Health (3)**  
Health and safety concerns related to workplaces and equipment. Examination of environmental conditions conducive to accidents and methods for monitoring these conditions. Staff
- 172 Accident Prevention (3)**  
Overview of accident prevention and loss control. Introduction to comprehensive safety concepts and methodology. Prerequisite: EMed 170. Staff
- 173 Assessment of Accident Risks (3)**  
Methods of obtaining, recording, and analyzing information related to causes of accidents in the community. Prerequisite: EMed 170, 171, 172. Staff
- 175 Ethics in Emergency Management (3)**  
Ethical issues pertaining to prehospital care and administrative practice. Topics include "do not resuscitate" orders, medical and religious conflicts, access to medical care, and the impaired provider. Prerequisite: EMed 18. DeAtley
- 180 Leadership Skills (3)**  
Development of skills in listening, delegation of responsibilities, discipline, and decision making. Staff
- 181 Integrated Emergency Management (3)**  
Identification of agencies involved in disaster response and development of an integrated emergency management system. Prerequisite: EMed 150. Staff
- 182 Public Education and Media Relations (3)**  
The role of the media in emergency medical services explored through classroom discussion with media representatives. Advantages and disadvantages of media coverage. Methodologies for public education about emergency medical services. Staff
- 183 Office Management (2)**  
Setup and management of an office, including establishment of filing systems, selection of office equipment, communication techniques, public relations and marketing. Staff
- 185 Emergency Management Research Design (3)**  
Basic principles and methods of data collection, analysis, and reporting. A research project is required. Prerequisite: EMed 18; concurrent registration. Stat 51
- 190 Seminar: Advanced Topics in Emergency Management (3)**  
Management issues, such as labor relations, collective bargaining, contract negotiation, financing, and formulation of public policy. Prerequisite: permission of instructor. Staff
- 199 Independent Study (3)**  
Individual research project in an area relevant to emergency medicine. For undergraduate seniors with permission of program faculty. DeAtley
- 200 Emergency Management Administrative Internship (13)**  
The student is assigned to a local emergency medical service agency to assist in the administration of its health care delivery program. Opportunity to evaluate health care service delivery and to devise protocols and regulations. DeAtley and staff
- 201 Cardiopulmonary Resuscitation Practicum (0)**  
Mechanical skills for providing basic cardiac life support (BCLS). Upon completion of EMed 201 and 230, the student receives BCLS certification. DeAtley and staff



- 230 **Emergency Medicine I (2)** DeAtley, Scott  
Required course for first-year medical students. Lectures, demonstrations, and practice sessions on basic prehospital assessment and stabilization. Upon completion of EMed 201 and 230, the student receives BCLS certification.
- 231 **Emergency Medicine II (1)** DeAtley and Staff  
Elective supplement to and expansion of EMed 230. The student is expected to develop proficiency equivalent to that of an emergency medical technician. Opportunities to spend time on a basic life support ambulance or a mobile intensive care unit. The student will receive BCLS certification after successful completion of the course. Prerequisite: EMed 230
- 302 **Emergency Medicine (3)** Scott and Staff  
Required for senior medical students. Rotating clinical shifts in the emergency unit of the University Hospital under supervision of the faculty and residents of the Department of Emergency Medicine. Videotaped lectures, daily student conferences, and required readings. Two week rotation with ten required clinical shifts. This course is prerequisite to all elective rotations in emergency medicine.
- 311 **Emergency Medicine (arr.)** Scott  
Elective in emergency medicine in a suburban community hospital. Participation in relevant conferences and weekly emergency medicine grand rounds. Holy Cross Hospital
- 312 **Emergency Medicine Elective (arr.)** Scott  
Elective for the student interested in emergency medicine as a career. The student is assigned a faculty preceptor and combines clinical experience with a research or administrative project.
- 313 **Emergency Medicine Elective (arr.)** Eastaugh  
Elective in emergency medicine in an urban community hospital. Providence Hospital
- 320 **Comparative Emergency Medical Services Systems (arr.)** Adams, Hunt  
Time is divided among EMS systems in the District of Columbia, Montgomery County, and Fairfax County. The student accompanies prehospital advanced life support providers and must complete assigned readings and a short written report on a prehospital care topic. Prerequisite: permission of instructor and, for visiting students, EMed 302 or equivalent.
- 330 **Clinical Toxicology (5)** Scott and Staff  
Under supervision, students work in the National Capital Poison Control Center at Georgetown University Hospital, responding to requests for information from the public and medical community. Also includes a series of seminars. Prerequisite: permission of instructor.
- 340 **Research Elective in Emergency Medicine (5)** Rosenthal  
Participation in ongoing research activities of the Department of Emergency Medicine.
- 350 **Wound Management (arr.)** Scott  
Wound care, including preparation, cleansing, debridement, anesthesia, repair, dressings, splints, and after-care instruction, under the supervision of emergency department staff. Two or four weeks.
- 390-93 **Extramural Emergency Medicine (arr.)**  
Elective periods at other institutions.
- 501 **Principles of Injury Control (arr.)** Shesser  
Epidemiology of all types of injury, with a strong emphasis on injury prevention. Automobile safety, sports injuries, home injuries, violence, drowning, and other topics. Principles of epidemiology, computerized database management, and injury control databases.

## Health Care Sciences

Chair: L.G. Pawlson

Courses numbered 10 to 96 are open only to military personnel in off-campus health sciences programs.

### 10 **Anatomy and Physiology (3)**

Staff  
Study of the human body. Etiology, arthrology, myology, hematology, immunology. Circulatory, respiratory, digestive, endocrine, excretory, nervous, and reproductive systems.

- 11 Applied Anatomy and Physiology (4)**  
Application of anatomical and physiological principles. Control of hemorrhage, methods of resuscitation, management of shock, relief of pain. Physical examination, nutrition, fluid and electrolyte balance, respiratory conditions, childbirth. Staff
- 12 Mathematics for Health Providers (2)**  
Provides a basis for understanding the equations used to calculate the effect of undersea pressure on the human body and the information necessary to apply these calculations to appropriate therapy, such as drug dosage and other modes of treatment. Staff
- 15 Pharmacology and Toxicology (arr.)**  
Pharmaceutical mathematics, terminology, preparations, compounding, physiological action and potential toxic reactions of certain drugs, legal aspects of drug regulations. Staff
- 16 Clinical Laboratory Techniques and Procedures (arr.)**  
Laboratory procedures used in basic health maintenance. Use of microscope, complete blood count, acid-fast stain, urinalysis, blood sedimentation rate, HbA<sub>1c</sub> card test, coagulation and bleeding time, blood grouping, blood typing. Staff
- 20 Radiation Biology (2)**  
Effects of ionizing radiation on various cells, tissues, organs, and the human body as an integrated unit. Organic and inorganic molecules; the human immune system, possible genetic effects and long- and short-term effects of radiation. History and use of radiation therapy, including therapy modalities, classification of neoplasms, types of therapy units, and treatments. Staff
- 21 Health Physics (4)**  
Concepts of radioactivity, including beta decay, isometric transmissions, electron capture, internal transition, alpha decay, the Auger effect, isotopic half-life, secular and transient equilibrium, artificial transmutations, nuclear reactions, and counting of statistics. Staff
- 22 Introduction to Epidemiology (1)**  
Study of common communicable diseases, immunologic factors, and procedures. Contact interviewing and reporting of communicable diseases. Staff
- 25 Management of Medical and Surgical Emergencies (7)**  
Basic techniques used in treating life-threatening situations. Clinical procedures include cardiopulmonary resuscitation, hemorrhage control, minor surgical procedures, and venous cutdowns. Dealing with drug overdose and treatment of acute medical problems. Staff
- 26 Medical Diagnosis and Treatment (arr.)**  
Introduction to the recognition of clinical disease states and determination of appropriate diagnostic techniques, with emphasis on advanced technology and of therapeutic approaches. Review
- 54 Techniques in Cardiac Resuscitation (2)**  
Basic cardiac life support techniques and skills needed in basic life support instruction training. Staff
- 66 Radiologic Fundamentals and Radiation Health (arr.)**  
Basic concepts used in diagnosis of disease using radiologic equipment. Commonly used positions, degrees of X-ray penetration, protective measures for patients and technologists. Safety techniques and acceptable units of radiation exposure. Review of NRC regulations, accountability, records, receipt of materials, and storage. Staff
- 67 Disaster Sanitation (3)**  
Survey of nuclear, biological, and chemical hazards, with emphasis on detection, protection of personnel, and related issues. Staff
- 68 Environmental Sanitation (1)**  
Study of environmental factors that contribute to human health: food, water, living and working spaces, economics, and pest control. Staff
- 75 Dental Fundamentals (2)**  
Overview of dental record screening, oral examination, X-ray interpretation, administration of anesthesia, and dental, endodontal, and periodontal treatment. Staff
- 83 Alcohol and Drug Abuse (2)**  
Types and magnitude of substance abuse, ethical and medical issues, impact on the family, and treatment. Staff
- 87 Surface Radiation Health (3)**  
Sources of radiation and radiation services and programs available in the U.S. Navy. Staff



- 90 **Occupational and Environmental Health** (arr.) Staff  
Basic environmental hazards, such as chemical and industrial exposure. Prevention and treatment of exposure to toxic substances. On-site evaluation of safety hazards and unsafe practices in the workplace.
- 92 **Medical Material Management** (4) Staff  
Material management in the medical facility. Budgeting, purchasing, material receipt and inspection, inventory of equipment and supplies, controlled medicals, stock record cards, surveys and adjustments, classes of plant property, property accountability, storage requirements.
- 93 **Health Systems Administration I** (arr.) Staff  
Health systems organization. General office procedures, standard subject identification codes, filing systems, records disposal, security of patient information, correspondence, procedural manuals.
- 94 **Health Systems Administration II** (4) Staff  
Planning office systems, procedures, environment, and location. Quality control, work measurement methods, authority and organizational relationships, principles of office organization, employee supervision.
- 95 **Records Management** (6) Staff  
Health records management. Classification of personnel, personnel records, promotions, educational services, career development, personnel orientation, medical care eligibility, patient data systems, statistical analysis.
- 96 **Clinical Experience** (arr.) Staff  
Supervised experience and research. Practical application of principles studied in the classroom.
- 100 **Clinical Medicine Review** (5) Staff  
For students in the physician assistant program who fail to meet the minimum scholarship requirement in the core curriculum by the end of the clinical year. Prerequisite: permission of program director.
- 101 **Environmental Biostatistics** (3) Staff  
Statistical reasoning, collection of data, rates, incidence, and prevalence. Generalization of observations and use of measurement data. For off-campus students.
- 102 **Food and Water Sanitation** (3) Staff  
General characteristics of urban and rural water systems, treatment and distribution, public bathing place sanitation, design and function of water treatment facilities. Dairy products and food sanitation, processing, storing, and distributing food. Supervision and training of food industry personnel.
- 103 **Academic Curriculum Tutorial** (arr.) Staff  
For students in the physician assistant program who fail to meet the requirement for satisfactory performance in one or more subject areas in the first-year curriculum. Prerequisite: permission of program director.
- 109 **Human Behavior I** (2) Killeen  
Basic knowledge of psychiatry needed to enter clinical work. Mental status examination as a tool of clinical assessment. Approaches to understanding and working with psychiatric patients.
- 111 **Anatomy and Physiology I** (4) Staff  
Combines content on Anat 115 and Phyl 111. For off-campus students.
- 112 **Anatomy and Physiology II** (4) Staff  
Continuation of HCS 111. For off-campus students.
- 113 **Preventive Medicine and Epidemiology for Physician Assistants** (2) Cawley  
Basic concepts of public health and epidemiology with emphasis on those applicable to primary care practice. Topics include biostatistics and use of clinical epidemiology in interpreting medical literature.
- 114 **General Laboratory Medicine for Physician Assistant Students** (2) Staff  
Basic theory, interpretation, and clinical-pathological correlations used in the clinical laboratory. Concentration on terminology, principles, and test-ordering practices associated results with health and disease states. For off-campus students only.
- 115 **Community Service** (3) Dunphy  
Required of all physician assistant students, designed to introduce the student to community based services in the Washington metropolitan area. Students participate at selected sites, for five to eight hours per month, over the last five semesters of the program.

- 116 **Medical Terminology (0)**  
Autotutorial completed before entering the physician assistant program. Terminology and vocabulary basic to all areas of medical science, hospital service, and allied health specialties. Killeen
- 119 **The Physician Assistant Role in Modern Health Care (2)**  
The role of physician assistants in health care delivery, with emphasis on determinants of health, organizational forces in the health care system, health policy and health financing issues, medical ethics, and legal and economic aspects of the health professions. Carlew
- 120 **Biochemistry for Health Sciences Students (2)**  
Basic concepts of biochemistry and their relation to the health sciences field. For off-campus students. Staff
- 121 **Microbiology for Health Sciences Students (arr.)**  
Basic concepts of microbiology and principles of microbial defense. Study of microorganisms of medical importance. For off-campus students. Staff
- 122 **Public Health Microbiology (3)**  
Application of basic microbiology, general principles of immunology and virology development of a surveillance protocol for nosocomial infection. For off-campus students. Staff
- 125 **Manifestations of Disease (5)**  
Interdisciplinary course in the theory of medicine using an organ system approach. Clinical findings and pathophysiology for a wide spectrum of diseases. Diagnosis and management of diseases in a variety of medical and surgical specialties. Prerequisite: Anat 115, Phyl 111. Open to graduate students with permission of instructor. Johnson, Killeen
- 126 **Clinical Approach to Diagnosis (arr.)**  
Equips the student with the basic skills needed to recognize clinical symptoms and arrive at a provisional diagnosis. For off-campus students. Staff
- 127 **Clinical Medicine I (arr.)**  
Introduction to the recognition of the clinical disease state, integrating knowledge acquired in the basic sciences. For off-campus students. Staff
- 128 **Clinical Medicine II (arr.)**  
Continuation of HCS 127, with emphasis on advanced technology used in diagnosis and review of the therapeutic approach. Prerequisite: HCS 127. For off-campus students. Staff
- 129 **Clinical Medicine III (arr.)**  
Continuation of HCS 128. For off-campus students only. Interdisciplinary course using an organ systems approach to the symptoms, diagnosis, and treatment encountered in a variety of disease states. Prerequisite: HCS 128. Staff
- 130 **Pathological Mechanisms of Disease (arr.)**  
Basic terms and concepts of pathology, infectious diseases and fundamental disease processes. Includes pathogenesis and dynamics of disease: causation, evolution and morphology of pathological changes in common diseases of each organ system. For off-campus students only. Staff
- 131 **Human Behavior II (2)**  
Continuation of HCS 109. Staff
- 133 **Introduction to Clinical Assessment (arr.)**  
Clinical interviewing and physical examination. The student should attain a beginner's level of clinical competence. For off-campus students. Staff
- 134 **Clinical Assessment (arr.)**  
Patient interviewing and physical examination, including integration of data obtained from the newer and more sophisticated modes of diagnostic technology. Powell
- 137 **Issues in Health Care (1)**  
Practitioner-patient interaction and the roles of law, ethics, economics, and government in the health care system. Shernoff
- 140 **Clinical Decision Making (2)**  
Methodological approach to clinical problem solving, with emphasis on interpretation of patient histories, physical examinations, laboratory results, and X-rays. Selection of appropriate pharmacological and nonpharmacological therapies. Students assist in analysis of clinical cases under faculty supervision and learn to evaluate symptoms in relation to pathophysiological changes. Open to graduate students with permission of instructor.



- 143 **Nurse Practitioner Seminar I (2)** Johnson  
Current developments in the role of the nurse practitioner, including discussion of reimbursement, nurse practice acts, liability coverage, malpractice, and role delineation.
- 144 **Nurse Practitioner Seminar II (3)** Johnson  
Health promotion and disease prevention, with emphasis on developing strategies for particular populations using an epidemiologic approach.
- 145 **Topics in Pediatrics (1)** Staff  
Topics covered include growth and development, child safety, common respiratory infections, asthma, and abdominal disorders.
- 146 **Topics in Emergency Medicine for Physician Assistants (arr.)** Staff  
Evaluation and treatment of the patient with an urgent problem. Review of signs and symptoms, accompanying physical findings, and methods for diagnosis and treatment of a spectrum of emergent illnesses. Development of skills used in the clinical year, including suturing, gowning and gloving, CPR and ACLS certification, cast application, intubation, and catheterization.
- 147 **Introduction to Radiology (1)** Staff  
Principles and language of radiologic imaging. Radiologic anatomy. Development of a systematic approach to radiology. Normal and abnormal radiological findings.
- 148 **Introduction to Electrocardiography (1)** Staff  
Fundamentals of electrocardiography and interpretation of basic ECG patterns. Common errors in taking and reading ECGs, with emphasis on identification of normal and abnormal wave patterns. Effects of drugs and electrolyte imbalance on ECG patterns.
- 151 **Clinical Pharmacology (arr.)** Staff  
Appropriate uses of medication and various treatment modalities. Dosages, actions, routes of administration, indications, and contraindications. Advantages, disadvantages, and reasons for selecting the drug of choice or an alternative.
- 153 **Gynecology Outpatient Nurse Practitioner (arr.)** Adams  
Elective rotation for nurse practitioner students. Management of gynecological problems in ambulatory setting.
- 154 **Clinical Geriatrics (arr.)** Adams  
Required rotation for nurse practitioner students. Students develop individual study and learning objectives in conjunction with their faculty advisers.
- 157 **Primary Care Preceptorship Nurse Practitioner (arr.)** Adams  
Required four-week rotation for nurse practitioner students. All aspects of patient management in ambulatory setting.
- 158 **Cardiothoracic Medicine Elective for Physician Assistants (4)** Sorenson  
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 159 **Dermatology Elective for Physician Assistants (4)** Sorenson  
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 160 **Medical Inpatient (5)** Sorenson  
Six-week rotation in which the student learns to collect and integrate information on the medical problems of patients who have been admitted to the hospital. The student is part of a medical team under the supervision of the medical resident or attending physician and is on regular call. Attendance is required at all work rounds, lectures, and conferences.
- 161 **Sports Medicine for Physician Assistants (arr.)** Staff  
Four-week rotation in the theory and practice of diagnosis, treatment, rehabilitation, and prevention of sports-related injuries. For off-campus students.
- 163 **Medical Outpatient (arr.)** Sorenson  
Six-week rotation in which the student learns to collect and integrate information on the various medical problems encountered in the ambulatory setting, such as an outpatient clinic, an HMO, or a community health center. Emphasis on differential diagnosis, patient management, and preventive medicine. The student is part of a health care team under a physician's supervision.

- 165 **Medical Outpatient: Nurse Practitioner (arr.)** Sorenson  
Elective rotation for nurse practitioner students, arranged with approval of advisor  
Aspects of specialty patient management in ambulatory setting
- 166 **Surgical Inpatient (arr.)** Sorenson  
Six week rotation in which the student learns to collect and integrate information on admitted surgical patients and gains experience in their pre- and post-operative management. Students assist during operative and ward procedures and function as part of the surgical team under a physician's supervision
- 168 **Urology for Physician Assistants (arr.)** staff  
Four-week rotation in which students integrate information on diagnosis and treatment of urologic conditions. For off-campus students only.
- 169 **Obstetrics and Gynecology (arr.)** Sorenson  
Six week rotation in which the student learns to collect and integrate information on obstetrical and gynecological patients. Students assist in outpatient gynecological and inpatient obstetrical practice as part of the health care team under a physician's supervision.
- 170 **Obstetrics and Gynecology: Nurse Practitioner (arr.)** Adams  
Elective rotation for nurse practitioner students. Students develop individual study and learning objectives in conjunction with their faculty advisors
- 171 **Pediatric Outpatient: Nurse Practitioner (arr.)** Adams  
Elective rotation for nurse practitioner students. Ambulatory pediatric practice
- 172 **Pediatric Outpatient (arr.)** Sorenson  
Six week rotation in which the student learns to collect and integrate information about the medical problems of the pediatric outpatient, under the direction of a pediatrician. Normal growth and development, pediatric history and physical examination, and management of common pediatric illnesses
- 173 **Special Projects Elective for PA MPH Students (4)** Carver  
Elective preceptorship/practicum experience for students in the combined Physician Assistant Master of Public Health Program. With faculty approval and preceptor supervision, students select and complete a project spanning clinical and/or research activities, special emphasis on public health and preventive medicine
- 174 **Primary Care (5)** staff  
Required rotation for off campus allied health students. All aspects of primary care medicine. Hospital rounds with attending physicians.
- 175 **Primary Care Preceptorship (arr.)** Sorenson  
Seven week experience in which the student functions as a physician assistant in a primary care setting. Appropriate primary care areas include pediatrics, internal medicine, family practice, and emergency medicine.
- 176 **Emergency Medicine Elective for Physician Assistants (4)** Sorenson  
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 177 **General Medicine Elective for Physician Assistants (4)** Sorenson  
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 178 **Emergency Medicine (arr.)** Sorenson  
Rotation in which the student learns to collect and integrate information on patients in an emergency room. Experience with a variety of emergency situations through rotating shifts. The student functions as part of the emergency medical team under the supervision of a physician.
- 179 **Emergency Medicine: Nurse Practitioner (arr.)** Adams  
Rotation for nurse practitioner students. Medical and surgical emergency management problems
- 180 **Practicum in Environmental Health (arr.)** staff  
Supervised fieldwork. Food service, housing, water, sewage and solid waste, and infectious diseases. Occupational health problems. Reports and conferences
- 181-82 **Introduction to Environmental Science (3-3)** staff  
General characteristics of urban and rural water systems treatment and distribution, public bathing place sanitation, design and function of water treatment facilities. Recognition and control of environmental pollution. Treatment and dis-



- posal of human wastes. Food sanitation, processing, storage, and distribution. Effects of major pollutants on people. Radiological safety. For off-campus students.
- 183 **Introduction to Industrial Hygiene (3)** Staff  
Chemical hazards: diseases caused by chemical exposure, toxic dust, metal fumes and vapor, gases and organic compounds. Physical hazards: biological effects of low and high temperatures, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and atmospheric pollution. For off-campus students.
- 184 **Public Health Organization and Administration (3)** Staff  
Public health activities, organization, and philosophy. Vital statistics, laboratory services, education, nursing, and social services. Administrative considerations, including governmental aspects, fiscal management, personnel factors, and public relations in public health organizations. For off-campus students.
- 185 **Environmental Impact and the Law (3)** Staff  
Rationale for environmental impact statements and government agencies responsible for these statements. Current statutes and regulations pertaining to the environment. For off-campus students.
- 186 **Orthopaedics Elective for Physician Assistants (4)** Sorenson  
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 187 **Radiology Elective for Physician Assistants (4)** Sorenson  
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 188 **Shock/Trauma Elective for Physician Assistants (4)** Sorenson  
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.
- 189 **Alcohol Rehabilitation Unit (arr.)** Staff  
Psychological and therapeutic approaches to care and rehabilitation of patients with alcohol-related disturbances. For off-campus students.
- 190 **Dermatology (1)** Staff  
Clinical assessment of common dermatologic conditions found in the ambulatory care setting. For off-campus students.
- 191 **Eye, Ear, Nose, and Throat (arr.)** Staff  
Diagnostic and therapeutic approaches to diseases of the eyes, ears, nose, and throat. For off-campus students.
- 192 **Orthopaedics (arr.)** Staff  
Diagnosis and treatment of common orthopaedic problems found in the primary care setting. For off-campus students.
- 193 **Clinical Aspects of Aging (2)** Johnson  
Common clinical problems of the elderly. Discussion of the demography, etiology, pathophysiology, diagnostics, and management of select problems. Health maintenance concepts. Issues concerning health policy and the aged.
- 194 **Practicum in Gerontology and Geriatric Care (arr.)** Staff  
Supervised fieldwork with the elderly or in administration and planning for the elderly. Offered in cooperation with other schools and departments of the University for medical students and for undergraduate and graduate students in the social sciences and health services administration.
- 195 **Ophthalmology (arr.)** Staff  
Recognition and management of common ophthalmologic problems. Performance of thorough ophthalmologic exams (excluding refraction) and provision of routine eye care. For off-campus students.
- 196 **Issues in American Health Care (arr.)** Povar  
Fieldwork combined with academic study of the health care system and its problems: cost, quality of care, delivery of care, ethical issues, health education, consumer issues. Field placements (12 to 20 hours per week) in appropriate health-related activities. Admission by permission of instructor. Undergraduate students only.

- 197 **Current Issues in Bioethics (1)** Staff  
Interdisciplinary approach to problems of bioethics. Presentations by physicians, nurses, lawyers, economists, philosophers, and health care administrators.
- 198 **Psychiatry (4)** Sorenson  
Four-week rotation in which the student learns to collect and integrate information on psychiatric patients. The student is part of the therapeutic community and assists in identification and treatment of the psychiatric patient.
- 199 **Independent Study (arr.)** Staff  
Required rotation in an area of study chosen by the student and approved by the faculty. Students develop learning objectives in conjunction with their faculty advisors.
- 201 **Practicum in Geriatric Care (1)** McConnell  
Geriatric assessment, including interviewing, physical exam, and functional assessment in outpatient and institutional settings. Participation in home visits and interdisciplinary seminars.
- 205 **Diagnosis and Management of Health Deviations (5)** Johnson, Stein  
Common health deviations of adults, with emphasis on the normal physiological and pathophysiological aspects of systems functioning. The systematic assessment and management of health deviations that form the foundation of clinical decision making for adult gerontological nurse practitioners in primary care. Primarily for students in the graduate program in primary care nursing offered in collaboration with George Mason University.
- 206 **Clinical Decision Making (2)** Povar  
Methodological approach to clinical problem solving, with emphasis on interpretation of patient histories, physical examinations, laboratory results, and radiographs. Selection of appropriate pharmacological and nonpharmacological therapies. Patient education, counseling, and referral. Students assist in analysis of clinical cases under faculty supervision and learn to evaluate symptoms in relation to pathophysiological changes. Primarily for students in the graduate program in primary care nursing offered in collaboration with George Mason University.
- 207 **Practicum in Advanced Health Assessment (arr.)** Staff  
Application of advanced health assessment and clinical decision-making skills, with emphasis on the collection of data needed to make a comprehensive health assessment. Students work with adult patients in primary care settings under faculty supervision. Primarily for students in the graduate program in primary care nursing offered in collaboration with George Mason University.
- 208 **Clinical Experience in Urban Health Care (1)** Bargmann  
An introduction to the clinical environment for increased awareness of health care issues. Students take part in a variety of clinical activities, including venopuncture, laboratory work, and history taking in an urban clinic for medically underserved individuals.
- 232 **Studying a Study: Methods for Reading the Medical Literature (1)** Riegelman  
Required course for first year medical students. Principles of analyzing medical journal articles, with emphasis on nonmathematical epidemiology and biostatistical principles and illustrations of errors that can occur in research articles.
- 233 **Epidemiology and Medical Decision Making (1)** Riegelman  
Required course for second year medical students. Principles of epidemiology and diagnostic testing. Rates of disease, assessment of risk and disease causation, and concepts of reproducibility, range of normal, sensitivity, and specificity. Case studies in epidemiology and introduction to diagnostic decision analysis.
- 301 **Clerkship in Primary Care (8)** Staff  
Required for third year medical students. Care of patients in ambulatory settings, including the George Washington University Health Plan (HMO), emergency room, and office practices of internists, pediatricians, and family practitioners. Emphasis on specialty areas that contribute to a physician's capacity to care for common minor illnesses: orthopaedics, otolaryngology, dermatology, and ophthalmology. Participation with District of Columbia Fire Department in responding to ambulance calls. Six-week elective periods throughout the academic year.
- 350 **Ambulatory Health Care Research (arr.)** Povar  
Research or clinical experience in primary medical care, including geriatric medicine. Participation in a project relating to health care delivery, including medical audit, study of organization of health services, and problems of underserved.



- (especially elderly) populations. Clinical experience is arranged. Exchanges with similar programs in other institutions are possible, especially for those participating in model family practice units.
- 360 **Family Practice Preceptorship** (arr.) Kallenberg  
Placement in a family practice setting.
- 361 **Family Practice Preceptorship** (arr.) Kallenberg  
Family practice preceptorship in rural Maryland, supervised by board-certified family practitioners in the Garrett County Medical Center. The physicians are affiliated with the University of Maryland Family Practice Program, of which this site is a part.
- 362 **Rural Family Practice Preceptorship** (arr.) Kallenberg  
Family health care in a small coal mining town in central West Virginia, supervised by board-certified family practitioners. The Somersville Hospital Family Practice Center includes facilities for outpatient, inpatient, and emergency services. Four-week elective periods.
- 363 **Geriatric Medicine** (arr.) Elon and Staff  
Clinical experience at a congregate housing facility, outpatient practice, hospital home visits, and a long-term facility. Opportunity to supplement experience with activity at senior centers and day care facilities.
- 365 **Ambulatory Care for the Urban Medically Underserved** (3) Bargmann  
Primary care experience in an urban community clinic for the medical underserved. Students evaluate and diagnose basic medical problems under the guidance of a clinical faculty member or resident.
- 369 **Issues in Health Care** (2) Povar  
Required for second-year medical students. Overview of issues such as the organization of health care and the role of different professions, concerns of patients, the patient-practitioner relationship, and legal and ethical problems of medical practice. Individual and group projects, seminar discussions, and panel presentations by patients.
- 390-94 **Extramural Health Care Sciences Elective** (arr.)  
Elective periods in community medicine, emergency medicine, or family medicine at other institutions.
- 398 **Advanced Clinical Experience in Primary Care** (arr.) Fenton  
For students who anticipate careers in primary care to further their clinical experience at an ambulatory care clinic, pediatrics, adult medicine, and geriatrics.
- 399 **Supervised Experience in Ambulatory Health Care** (5) Fenton  
For fourth-year medical students by arrangement between the department and the dean's office.
- 400 **Medical Decision Making** (2) Staff  
Required course for all medical students. Concepts necessary for understanding new diseases, new diagnostic technology and new therapies, with examples of clinical applications. Principles of decision analysis, cost-benefit analysis, technology assessment, and preventive medicine. Applications of computers to clinical care.
- 502 **Organization and Financing of Health Care** (3) Birnbaum  
Structural and financial factors that shape health care delivery in the United States, with emphasis on the organizational provider, although the role of the individual provider is also addressed.
- 504 **Medical Law for the Attending Physician** (3) Fiscina and Staff  
Legal attempts to define professional conduct under varying clinical circumstances. Study of landmark cases and of the process used in the judicial system to analyze the reasonableness of professional conduct.
- 505 **Biomedical Ethics** (5) Glover and Associated Faculty  
An intensive course in ethics offered cooperatively with the medical schools at Georgetown, Howard, and Uniformed Services Universities. Subjects will be chosen from areas of current concern in the medical professions, including delineation of the physician and patient roles, informed consent, research issues, issues in death and dying, genetic counseling, practitioner's social responsibility, allocation of scarce resources, and federal health policy.
- 509 **Medical Humanities** (arr.) Glover and Staff  
Students pursue an in-depth study of medicine as it relates to ethics, history, etc., as agreed by student and preceptor.

## Interdisciplinary Courses

First-year medical students are required to take Idis 212, administered by the Departments of Anatomy and Physiology. Second-year students are required to take an interdisciplinary program of study that includes Idis 301-2, Path 201-2, Phar 201-2, HCS 137, and Pchi 201. This program provides basic instruction in various clinical subjects and prepares students for clinical clerkships and electives in the third and fourth years.

- 201 **Seminar for Special Program Students (1)** Staff  
An elective for students in the first year of the Doctor of Medicine special program. Concentration on learning strategies to develop individual strengths. May be repeated for credit.
- 212 **Neurobiology (3)** Staff  
Same as Anat/Phyl 212. Integrated survey of the structure and function of the human nervous system. Lecture, clinical demonstration, and laboratory.
- 301-2 **Introduction to Clinical Medicine (8-8)** Staff  
One-year course. Integrated, organ-oriented course, with emphasis on physical diagnosis. Basic instruction in child health and development, clinical problem solving, dermatology, gynecology, internal medicine (including subspecialties: neurology, obstetrics, ophthalmology, psychiatry, radiology, and urology). Experience in hospital-based physical diagnosis and history taking.
- 800 **Summer Remedial: Clinical Medicine (16)**
- 801 **Summer Remedial: Neurobiology (3)**

## Medicine

*Chair J.C. Rios*

- 201 **Diagnostic Studies in Clinical Medicine (1)** Scott  
Didactic sessions on physiopathology and its correlation to laboratory studies, practical sessions, and case problems related to the use of laboratory tests and other diagnostic procedures, with emphasis on decision making. Second-year students only.
- 250 **Introduction to Occupational and Environmental Medicine (2)** Chase  
Health effects of various occupational and environmental hazards and pollutants such as radiation, air and water pollution, toxic substances, and environmental extremes. Perspectives of basic research, federal regulation, labor/management, and the physician.
- 305 **Inpatient Clerkship (10)** Staff  
Required for medical students. Comprehensive study of patients; history and physical examination, ward rounds, consultations, conferences, preceptorial teaching, seminars. V.A. and University Hospitals and Washington Hospital Center. Eight-week periods throughout the academic year.
- 330 **Acting Internship in Medicine (arr)** Staff  
The student performs initial evaluations and develops treatment plans for selected patients under the direct supervision of a preceptor. Northern Virginia Doctors Hospital.
- 331 **Medical Hematology-Oncology (arr)** Siegel and Staff  
Assignment to a ward team dealing exclusively with oncologic problems, including many patients on chemotherapy protocols. Special conferences and regular case staff conferences. Students take night call with the ward team and are expected to function at the level of interns on the team. Four-week periods. University Hospital.
- 332 **Acting Internship in Medicine (5)** Parent  
Assignment to a ward team. Responsibility for completing initial patient evaluation and diagnostic and therapeutic plans, writing all medical orders (countersigned by an M.D.), coordinating patient's care, writing progress notes, and dictating discharge summary. Night call with the ward team; supervision by team resident.
- 333 **Acting Internship in Medicine (5)** Curtin  
Under the supervision of the medical resident and attending physician, student works with a patient-care team on a medical ward, does initial evaluation, and



- presents patient's problem at attending rounds and appropriate teaching conferences. Subspecialty consultants review patient's problem with student. Four-week elective periods. Washington Hospital Center.
- 334 **Acting Internship in Medicine (5)** O'Connell  
Assignment to a patient-care team under direct supervision of a University resident on general medical wards. Problem-Oriented Medical Record System used. Students complete initial patient evaluation data base, are responsible for clinical management during hospitalization, write all orders (reviewed and cosigned by the resident), and present their patients at attending rounds and conferences. Close supervision and guidance by the team resident, attending physician, and subspecialty consultants. Four-week elective periods. V.A. Hospital
- 335 **Acting Internship in Medicine (arr.)** Wisneski  
Academically oriented acting internship in a community hospital setting. Emphasis on basic clinical medicine. Responsibilities of intern. Holy Cross Hospital
- 336 **Medical Intensive Care (5)** Schwab and Staff  
Student works on a medical intensive care unit with intern-like duties, including night call. Four-week elective periods. Washington Hospital Center
- 337 **Senior Clerkship in Medicine (5)** Weiss and Associated Faculty  
Assignment to a ward team that includes a medical resident and attending physician. Students are assigned patients, complete initial medical evaluations and diagnostic and therapeutic plans, and write all orders (countersigned by an M.D.). Night call approximately every third night. Attending rounds conducted by practicing physicians three times per week. Students are expected to attend the daily morning report and noon conference. Providence Hospital
- 338 **Occupational and Environmental Medicine (arr.)** Chase  
Assignment to Washington Occupational Health Associates, which addresses the effects of occupational and environmental health hazards. Participation in clinical intervention, under physician's supervision. Emphasis on relationship of occupational and environmental medicine to practice of primary care. Opportunity to visit field sites is generally available.
- 339 **Occupational and Environmental Medicine (arr.)** Welch  
A clinical rotation evaluating patients with a variety of occupational diseases or hazardous exposures. Student assumes primary responsibility for management of cases, including a visit to the workplace when feasible. Each student presents a seminar on a clinical topic.
- 348 **Infectious Disease (5)** Tauber  
Patients with a variety of infectious diseases are seen and evaluated in conjunction with an infectious disease Fellow and attending physician. Experience in consulting on ambulatory and hospitalized patients with various documented or potential infectious illnesses. National Naval Medical Center.
- 349 **Infectious Disease (5)** Lew, Curtin, Smith  
Clinical experience on infectious disease service. Daily work rounds, including lab, conferences, journal club. Four-week elective periods. Washington Hospital Center.
- 350 **Infectious Disease (arr.)** Gordin and Staff  
Introduction to the diagnosis and treatment of bacterial, viral, fungal, and mycobacterial infections. Students assume primary responsibility for infectious disease consultations in conjunction with Fellows, residents, and full-time faculty members. Clinical application of laboratory techniques used in the diagnosis and treatment of patients with infectious disease problems. Emphasis on the usefulness of rapid diagnostic techniques and pharmacology of antimicrobics. Students participate fully in all section activities. Four-week elective periods. V.A. Hospital
- 351 **Infectious Disease (arr.)** Tuazon and Staff  
Clinically relevant aspects of microbiology and immunology; relevant aspects of patient history, physical, and laboratory examination. Experience in consultations on infectious disease and use of antibiotics.
- 352 **Cardiology (5)** Hsu  
Experience in ambulatory and hospitalized patient care. ECGs, graphics, CCL, exercise lab. Observation in cardiac catheterization laboratory. Four-week elective periods.
- 353 **Preceptorship in Cardiology (5)** Ross  
Placement with an affiliated Washington area practicing cardiologist. Experience in office and hospital cardiology and electrocardiography.

**356 Cardiovascular Diseases (arr.)**

Haider, Meyer

Students participate in nonemergent cardiac problems and routine problems and their diagnostic evaluation. Rounds three times weekly, weekly teaching conferences with members of the cardiology staff. Later assignment to a 12 bed critical care unit that includes coronary patients and medical-surgical patients with intensive care problems. Under supervision of a senior resident, student works up patients admitted to these units, attends daily rounds with teaching physicians and assists in the care of critically ill patients and those with suspected myocardial infarction or cardiac arrhythmias. Includes experience with invasive monitoring and therapeutic techniques.

**358 Cardiology (5)**

Lindsay and Staff

Participation in the clinical cardiology service of Washington Hospital Center. Bedside evaluation correlated with electrocardiography and other diagnostic studies including stress testing, phonocardiography, echocardiography, cardiac catheterization, and nucleide angiography. Four week elective periods. Washington Hospital Center.

**359 Coronary Care Unit (5)**

Van Voorhees

Participation in the care of patients on the coronary care unit of Washington Hospital Center. Student works closely with house staff and attending staff. Emphasis on diagnosis and treatment of coronary disease, complications of infarction, diagnosis and treatment of arrhythmias, and selection of patients for surgical intervention. Four-week elective periods. Washington Hospital Center.

**360 Cardiology (5)**

Fletcher\* and Staff

Experience in clinical cardiovascular problems under supervision of cardiology staff. Emphasis on history, physical diagnosis, and noninvasive cardiovascular techniques. Role of cardiac catheterization and results in specific cases. Electrocardiography as a tool for evaluating the cardiovascular patient. Patient management. Teaching rounds and conferences. Four week elective periods. V.A. Hospital.

**361 Cardiology (arr.)**

Epstein, Barton

Observation of all aspects of congenital and acquired cardiac disease. Participation in diagnostic and therapeutic work up of patients and evaluation of acute and long term effects of medical and surgical interventions. National Institutes of Health.

**362 Cardiac Catheterization (arr.)**

Richard, Lindsay

The student interviews and examines two patients before catheterization, analyzes the data available, and presents patients to the catheterization team. Observation of the performance of catheterization, participation in the analysis of hemodynamic and angiographic data, and discussion of the physiologic and pathologic processes involved and the therapy applicable to each case.

**363 Medical Intensive Care and Coronary Care Unit (5)**

Carlson

Evaluation and management of acute medical illness, including myocardial infarction, severe heart failure; cardiac dysrhythmia; respiratory, renal, and hepatic failure. GI bleeding, and acid-base and fluid-electrolyte disturbances. Procedures and devices used on the unit, including cardioversion, temporary and permanent cardiac pacemakers, right heart and arterial catheterization, intra-aortic balloon counterpulsation, invasive and noninvasive electrophysiologic study, mechanical ventilators, and oxygen therapy. Students take call every third night with a medical resident and intern. V.A. Hospital.

**364 Critical Care Medicine (arr.)**

Combs

Evaluation and treatment of the critically ill, including physical examination, laboratory testing, ECG interpretation, invasive monitoring, ventilator management, dialysis, pharmacotherapy, and nutritional support. Physiology of normal organ system function and the pathophysiology of organ system failure.

**370 Endocrinology (arr.)**

El-Khodary

Assignment as an acting intern to work with a second- or third-year resident. Admission and work up of patients. Consultations of the general medical service on patients with endocrine problems. Daily rounds and weekly teaching conference to discuss endocrine problems. Opportunity for participation at D.C. General Hospital. In-depth evaluation of patients with endocrine problems. Emergency care of patients admitted to medical floors and intensive care unit for life-threatening endocrine emergencies.

\* Dr. Fletcher is Chief of Cardiology at the Veterans Administration Hospital.



- 372 **Endocrinology and Diabetes** (arr) Ratner and Staff  
Clinical experience in endocrinology and metabolism: emphasis on outpatient care of diabetes mellitus with longitudinal follow-up. Students examine patients and participate in the diagnosis and planning of therapy. Daily rounds, weekly diabetic pregnancy clinic, lectures, and case discussions. University Hospital.
- 373 **Endocrinology and Metabolism** (arr) Becker and Staff  
Clinical experience in endocrinology and metabolism. Students examine endocrine patients, make preliminary diagnoses, and assist in treatment. Daily clinical rounds, weekly endocrine clinic, diabetic clinic, and journal club; case discussions, lectures. Twice-weekly endocrine reviews based on assigned reading. V.A. Hospital.
- 375 **Endocrinology Research** (arr) Becker  
Participation in endocrinology and metabolism research laboratory. Introduction to chemical and technical aspects of endocrine research. Participation in ongoing research activities. Students learn appropriate procedures, such as radioimmunoassay of hormones, histopathologic techniques, atomic absorption spectrophotometry, and investigative approach to solving research problems. Prior interview with instructor required.
- 390-95 **Extramural Internal Medicine Elective** (arr)  
Elective periods at other institutions.
- 398 **Pre-Operative Assessment and Consultative Medicine** (5) Malakoff  
Medical follow-up of patients on surgical, orthopaedic, psychiatric, and obstetrics and gynecology services. Didactic sessions on pre-operative evaluation and peri-surgical risk.
- 399 **General Internal Medicine Inpatient Service** (5) Malakoff  
Medical consultative and follow-up services to patients on surgical, orthopaedic, psychiatric, and obstetrics and gynecology services. For students required to undertake remedial work because of unsatisfactory performance in their third-year rotations.
- 403 **Oncology** (arr) Cohen  
Participation in clinical management of patients with carcinoma on the oncology ward. Methods of clinical research are stressed. V.A. Hospital.
- 405 **Introduction to Medical Oncology** (arr) Priebe  
New patient consultations, ward rounds, and clinic involving patients with both hematologic malignancies and solid tumors. Daily discussions on selected topics in medical oncology. Interdisciplinary conferences with V.A. Hospital staff. Washington Hospital Center.
- 411 **Gastroenterology/Cardiology** (5) Chang, Ramaswamy  
Observation and assistance in upper endoscopy, colonoscopy, cardiac catheterization, and related procedures, at area hospitals. Work up of selected cases, reading of relevant literature, and case presentation.
- 413 **Gastroenterology/Hepatology** (5) Fromm and Staff  
Intensive clinical experience with patients who have diseases of the gastrointestinal tract, liver, and pancreas. Patient consultations, teaching rounds, seminars, joint conferences with surgery, pathology, and radiology emphasize multidisciplinary approach to digestive diseases.
- 414 **Gastroenterology/Hepatology Nutrition** (arr) Seeff  
Students work closely with fellows in the gastroenterology/hepatology nutrition section, seeing patients on consultations and being involved in the initial evaluation, patient investigation, and follow-up. Close supervision by both the senior fellows and senior staff. Direct or indirect participation in all specialized procedures involving various biopsy techniques and endoscopies. Teaching rounds, conferences, and seminars. V.A. Hospital.
- 415 **Gastroenterology** (arr) Gold  
Course includes direct patient contact on a consultative basis and participation in all section activities, including reviews of gastrointestinal pathology and radiology for individual patients and all procedures, particularly endoscopic. The student is expected to develop a basic knowledge of gastroenterology and to participate in a journal activity and may be called on to participate in a case presentation at monthly joint GI grand round sessions. Washington Hospital Center.
- 416 **Gastroenterology** (arr) Rudzki and Staff  
Participation in ward rounds with fellows and attending physicians, endoscopic procedures (performed twice a week), journal club, GI medical-surgical conference, teaching conferences, and weekly clinic session. Direct responsibility for a

- number of consultations under the supervision of the GI Fellows D.C. General Hospital.
- 417 **Gastroenterology (arr.)** Wong  
Participation in daily inpatient and outpatient activities of the service. Walter Reed Army Medical Center.
- 418 **Gastroenterology (arr.)** Volpe  
Participation in daily inpatient and outpatient activities of the service. National Naval Medical Center.
- 419 **Gastroenterology (arr.)** Gibbons  
Responsibility for the care of patients admitted with GI problems and consultations on patients on other services. Daily rounds and weekly teaching conference. Observation of endoscopic procedures, including esophagogastroduodenoscopy, colonoscopy and polypectomy, laparoscopy, liver biopsies, and esophageal dilatation. Involvement with patients in the intensive care unit with acute gastroenterology problems. Providence Hospital.
- 423 **Gastroenterology (5)** Trujillo, O'Kieffe  
Introduction to clinical problems in diagnosis and treatment of gastroenterology in both office and hospital practice. Peritoneoscopy, endoscopy, and biopsies. Four week elective periods. University Hospital.
- 430 **Hematology (arr.)** Schechter and Staff  
Experience in the evaluation and treatment of patients with hematological disorders. Ward rounds, morphology review sessions, hematology clinic, and journal club. V.A. Hospital.
- 431 **Hematology/Oncology (arr.)** Lessin and Staff  
Diagnosis and therapy of hematologic and oncologic disorders, including inpatient and outpatient consultations, daily care, and follow up of clinical hematologic and oncologic problems. Emphasis on blood and marrow morphology, tumor pathology, modern hematologic oncologic diagnostic procedures, and treatment of blood diseases and cancer.
- 434 **Hematology/Oncology (arr.)** Yoo  
Assignment with senior resident seeing patients with hematologic and tumor problems, interpreting blood smears and blood coagulation studies, and assisting in performance and interpretation of bone marrow examinations. Providence Hospital.
- 436 **Hematology Research (arr.)** Schechter and Staff  
Research interests of the staff include lymphocyte tumor biology stem cell culture and platelet production and hemostasis. Facilities available to do *in vitro* culture of human peripheral blood, bone marrow, and tumors; radioisotopic studies and electron microscopy. V.A. Hospital.
- 440 **Pulmonary Medicine (arr.)** Spagnolo and Staff  
Experience in the diagnosis and therapy of patients with pulmonary disease. Introduction to the management of patients with acute respiratory failure. Daily ward rounds, chest roentgenology review sessions, journal club, and physiology conference. Emphasis on modern pulmonary diagnostic procedures and current literature. V.A. Hospital.
- 441 **Pulmonary Disease (arr.)** Weiss  
Responsibility for the care of patients admitted with pulmonary problems and consultations on patients on other services. Daily rounds and weekly teaching conference. Weekly pulmonary physiology conference in which arterial blood gases, pulmonary function testing, and principles of respiratory care are discussed in depth. Consultation services and daily care of a small number of inpatients. Observation of such procedures as pleural biopsy, thoracentesis, lung needle biopsies, and arterial puncture. Involvement on a consulting basis with all patients in the intensive care unit with acute respiratory problems. Providence Hospital.
- 442 **Pulmonary Disease (5)** Levit, Schwab, Friedman  
Interpretation of pulmonary function studies. Daily teaching rounds and supervised consultation on patients with various pulmonary and infectious diseases. Participation in pulmonary clinic. Techniques and principles of respiratory therapy. Principles of and experience with respiratory failure and respiratory intensive care. Washington Hospital Center.
- 447 **Pulmonary Medicine (5)** Spagnolo and Staff  
Experience in the diagnosis and therapy of patients with pulmonary disorders. Ward rounds, chest roentgenology sessions, and journal club. Emphasis on modern pulmonary diagnostic procedures and current literature. University Hospital.



- 448 **Practicum in Pulmonary Function and Exercise Physiology (arr.)** Medinger  
Observation of clinical pulmonary function testing, arterial blood gas analysis, and exercise testing. Interpretation of test results and correlation of pulmonary physiology with other clinical manifestations and progress of pulmonary diseases.
- 451 **Arthritis and Rheumatic Diseases (5)** White  
Experience in the evaluation and treatment of patients with rheumatic diseases, including inpatient and outpatient consultations, daily care and follow up, and clinical conferences. Discussion of selected topics in rheumatology, emphasizing differential diagnosis, pathophysiology, and therapeutic modalities.
- 452 **Rheumatology (5)** Nashel  
Participation in the work up and management of inpatients and clinic patients with rheumatic diseases. History, physical examination, differential diagnosis, immunological mechanism, X-ray reading, and use of laboratory tests stressed. V.A. Hospital
- 453 **Introduction to Arthritis (arr.)** Barth  
Work up, rounds, clinic, and consultations on patients with arthritis and rheumatic diseases. Daily discussions on selected topics in rheumatology, including clinical immunology, major disease categories (SLE, RA, gout, etc.), differential diagnosis, drug therapy, serological reactions, X-ray changes. Washington Hospital Center
- 454 **Rheumatology and Orthopaedics (Pediatric) (arr.)** White and Staff  
Students assist in the evaluation, treatment, and follow up of children with rheumatic and orthopaedic problems. Responsibilities in outpatient and inpatient services; the student may elect to participate in operations. Discussion of selected topics in rheumatology and orthopaedics. Participation in clinical conferences, including physical medicine and radiology.
- 455 **Physical Medicine and Rehabilitation (arr.)** Levin  
Management of patients on the inpatient rehabilitation service under supervision. Initial medical and neurological work up, setting of goals, and participation in rounds and team conferences. Outpatient work includes use of electromyography and the neuromuscular examination as diagnostic tools and management of common musculoskeletal conditions.
- 456 **Elective in Physical Medicine and Rehabilitation (arr.)** Dulac  
An exposure to physical medicine and rehabilitation in a diverse and established practice with four board-certified physiatrists. This will include inpatients, outpatients, and hospital and office practice.
- 460 **Renal and Electrolyte Disorders (arr.)** Pierce  
Participation in consultations, rounds, and outpatient clinic involving patients with renal and electrolyte abnormalities; follow-up of patients. Examination of the urinary sediment, peritoneum, and hemodialysis. Conferences, reading assignments, journal club. Washington Hospital Center.
- 461 **Renal Disease (5)** Borch and Staff  
Experience in clinical and laboratory procedures used in the study of renal disease. Ward rounds, consultations, conferences, seminars. University Hospital.
- 463 **Diagnostic Laboratory Immunology (5)** Phillips  
Introduction to interpretation of the various laboratory assays used in clinical diagnostic immunology. Review of clinically applied immunology and its relationship to autoimmunity and immunologically mediated pathology. Clinical techniques for altering the course of immunological diseases, such as plasmapheresis. Tissue immunology as related to typing transplant patients.
- 465 **Renal Diseases and Fluid and Electrolyte Problems (5)** Jacobson  
Participation in office and hospital consultations, care of patients with renal diseases and fluid and electrolyte problems. Familiarization with a variety of renal problems, work ups of patients with renal disease; evaluation of renal function studies. Emphasis on critical use of medical literature.
- 469 **Renal Disease (arr.)** Ooi and Staff  
Participation in all clinical activities of the renal section, including consultations, hemodialysis, outpatient clinic, rounds, conferences, and journal club meetings. V.A. Hospital.
- 471 **Allergy Clinic (arr.)** Smith  
Lectures, conferences, and attendance at the allergy clinic, where both adult and child patients are seen. Detailed history taking, physical examination, and skin-testing techniques. Discussion of each case with an allergist to develop a complete management program. Emphasis on clinical aspects of immunology. Walter Reed Army Medical Center.

- 472 **Private Office Practice of Allergy** (3) Barr and Staff  
Combined elective with allergy clinic at University Hospital and Children's Hospital
- 494 **Clinical Cancer Epidemiology** (arr.) Levine  
Through the clinical epidemiology branch of NIH, students may participate in research and consultation in the clinical etiology of cancer, seeing patients with peculiarities in the occurrence of cancer that raise the possibility of detecting clues to the etiology of tumors; the application of computer technology to epidemiologic studies, or registry of rare tumors (investigating etiology of rare disorders, e.g., the American Burkitt Lymphoma Registry). Members of this branch participate in the genetics clinic, and students have opportunities for clinical contact while pursuing research and learning basic epidemiologic approaches. Useful for students considering preventive medicine, epidemiology, or public health as a career. National Institutes of Health
- 499 **Clinical Electrocardiography** (1) Rios  
EKG interpretation, EKG diagnosis using the spatial vector approach of Dr. R. P. Grant. Diagnosis of arrhythmias, cardiac pacing, holter EKG monitoring, and exercise electrocardiography. All members of the division of cardiology participate in at least one lecture.
- 501 **Immunopathogenesis of Human Disease** (3) Phillips  
Review of recent advances in immunobiology and correlation with clinical manifestations and immunopathogenesis of selected human diseases. Lectures, group discussions, assigned readings, and required seminar presentation based on independent study.
- 502 **Issues in Clinical Nutrition** (3) Tziraki, Waller  
Analysis and evaluation of recent scientific data in the area of human nutrition. Topics include megavitamins, trace elements, food additives, fiber content, lipids, proteins, immunological responses, and nutrition as they influence health and disease. Daily didactic sessions, three seminars per week for discussion and analysis of assigned reading. Each student studies a specific area of interest and presents a written analysis of the scientific data.
- 503 **Clinical Physiology of Acid-Base and Electrolyte Disorders** (3) Kimmel  
In-depth review of renal physiology as it relates to clinical medicine, with emphasis on water and electrolyte regulation as well as acid-base and electrolyte disorders. Daily didactic sessions, three seminars with problem-solving cases per week, homework exercises and assigned reading. Each student presents a written report on a clinical entity related to a selected fluid and electrolyte disorder.
- 504 **Topics in Clinical Toxicology and Occupational Medicine** (arr.) Welch  
Clinical toxicology of occupational and environmental medicine. Didactic sessions and student led seminars.
- 505 **Geographic Medicine and Tropical Disease** (arr.) Tuzson  
Lectures, laboratory sessions (examination of various specimens for parasites), patient presentation and demonstration, and group discussion.
- 506 **International Health** (arr.) Rios  
Health issues in lesser developed countries, including cultural, social, and economic issues. The role of developed societies in helping to meet the health needs of underdeveloped countries and the role of technology transfers. Independent reading and topic presentations. Fieldwork is possible in an I.D.C. primary care program or public health project.

## Microbiology and Immunology

Chair L.F. Affronti

- 128 **Microbiology for Health Sciences Students** (2) Staff  
Lecture course for students in health sciences programs. Basic concepts of microbiology and principles of microbial defense. Study of microorganisms of medical importance.
- 129 **Immunology-Introduction to Immunologic Fundamentals** (4) Affronti, Silver  
Lecture course for medical technology students open to others. Fundamental immunologic concepts. Serologic and immunologic procedures as applied to clinical and research situations. Prerequisite: introductory courses in microbiology and chemistry (inorganic and organic), or permission of instructor.



- 201 Medical Microbiology (8)** Staff  
Required for medical students; open to qualified graduate students with permission. Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa, and immunological concepts that relate to the health and disease of humans—cultural studies, methods of diagnosis, theories.
- 223 Antimicrobial Chemotherapy (1)** Reich  
For medical students. Lecture course. Selection, clinical applications, and mechanism of action of various drugs and antibiotics used in the treatment of microbial infections. Prerequisite: Micr 201.
- 231 Immunobiology (1)** Affronti, Kind  
For medical students; open to graduate students. Lecture course. Study of immunological functions of reticuloendothelial tissues, theories of autoimmunity, graft rejection, tumor immunity, delayed hypersensitivities, and immunogenetics. Prerequisite: Micr 201 or 229 and permission of instructor.
- 252 Medical Parasitology (1)** Staff  
For medical students; open to graduate students. Lecture and laboratory course. Life cycles, epidemiology, manifestations, pathology, diagnosis, treatment, and prevention of medically important protozoan and helminthic infections. Laboratory emphasizes recognition and identification of the etiologic agents causing disease through the study of living and preserved specimens.
- 255 Clinical Virology (1)** Staff  
Elective course for medical students; open to graduate students. General principles of virology, with emphasis on clinical situations. Prerequisite: Micr 201 or equivalent.
- 281 Biological Basis of Infections (arr.)** Affronti  
Selected problems, readings, laboratory studies, term paper.
- 282 Immunology (5)** Affronti and Staff  
Selected problems in immunology. Library assignments, laboratory research, and term paper.
- 290-91 Extramural Microbiology Elective (arr.)**  
Elective periods at other institutions.
- 293 Special Topics in Microbiology (arr.)** Staff  
May be repeated for credit.
- 295 Research in Microbiology (arr.)** Staff  
Content differs each time course is given. May be repeated for credit.
- 501 Molecular Biology of Viruses (arr.)** Kingsbury  
Selected problems related to the biology and biochemistry of viruses, with special emphasis on HIV and neurotropic viruses.
- 800 Summer Remedial: Microbiology (8)** Affronti

## Neurological Surgery

Chair: E.R. Laws

- 302 Clinical Clerkship in Neurosurgery (3)** Laws  
Introduction to neurosurgery, emphasizing the neurological examination, diagnosis, and rudiments of treatment. Fulfills the neuroscience course requirement. University Hospital.
- 340 Neurosurgery (5)** Laws  
Clinical clerkship in neurosurgical service, emphasizing neurologic examination and indications for special neurologic and operative procedures. Medical Faculty Associates and University Hospital.
- 342 Neurosurgery (5)** Pulliam  
Participation in all departmental activities, ward rounds, daily conferences, radiographic and pathologic studies, and operating room procedures. National Naval Medical Center.
- 344 Pediatric Neurosurgery (arr.)** McCullough and Staff  
Participation in all departmental activities: ward rounds, daily conferences, radiographic studies, and operating room procedures. Children's Hospital.
- 346 Neurosurgery (arr.)** Cooney  
Participation in all departmental activities, ward rounds, daily conferences, radiographic studies, and operating room procedures. Washington Hospital Center.
- 390-92 Extramural Neurosurgery Elective (arr.)**  
Elective periods at other institutions.

## Neurology

*Chair* G.F. Molinari

- 380 **Neurology (arr.)** Molinari and Staff  
Expertise in performing the neurological examination taught through work-up of new hospital and clinical patients, with emphasis on the anatomical localization of neurological symptomatology. Introduction to differential diagnosis. Familiarization with indications for neurological procedures (CT scanning, arteriography, myelography, evoked potentials, and EEG). Lecture series reviews the basic categories of neurological diseases.
- 383 **Neurology (5)** Gunderson  
Development of proficiency in assessing common neurologic problems through mastery of the routine neurologic history and physical examination, use of laboratory aids, and application of neuroanatomy to clinical problem solving. Treatment of common neurology problems. Walter Reed Army Medical Center
- 384 **Neurology (arr.)** Laurence  
Clerkship in neurology. Participation in neurology consultation service, clinic, and seminars. In-depth research for formal seminar presentation. Washington Hospital Center
- 390-94 **Extramural Neurology Elective (arr.)**  
Elective periods at other institutions.
- 395 **Neurology Research (arr.)** Laurence  
Participation in ongoing research in nutritional deficiency, toxins, and fluid-electrolyte derangements and their effects on brain and muscle. Washington Hospital Center

## Obstetrics and Gynecology

*Chair* A.B. Weingold

- 303 **Clinical Obstetrics and Gynecology (10)** Davis  
Required for medical students. Participation in all obstetrical and gynecological clinics, daily departmental conferences, and ward rounds. Eight week periods throughout the academic year. University, Fairfax, and Holy Cross Hospitals
- 376 **Gynecologic Oncology (5)** McGowan  
Experience in clinical inpatient and office diagnosis and treatment of women with gynecologic cancer. Medical Faculty Associates
- 377 **Cytogenetics and Prenatal Diagnosis of Birth Defects (arr.)** Larsen  
Study of cytogenetics and participation in genetic counseling, amniocentesis, and laboratory evaluation of amniotic fluid. Interpretation and preparation of chromosome karyotype.
- 378 **Reproductive Endocrinology and Infertility (arr.)** Stilman  
Experience in management of patients with gynecologic endocrine and infertility problems. Infertility work-up and operative diagnostic and therapeutic procedures, including *in vitro* fertilization-embryo transfer.
- 379 **Clinical Obstetrics and Gynecology (arr.)** Rothman  
Participation in all facets of clinical work, including surgery, C sections, laser surgery, and pelvic sonograms. Alexandria Hospital
- 380 **Clinical Obstetrics and Gynecology (arr.)** Gahres, Radice  
Participation in patient care, clinics, surgery, delivery. Alexandria Hospital
- 381 **Perinatal Medicine (arr.)** Lanow  
Experience in high-risk obstetrics clinics and antepartum and intrapartum management of high risk and normal obstetrical patients. Participation with Fellows in maternal-fetal medicine at the University Hospital and outlying hospitals. Required paper.
- 384 **Clinical Obstetrics and Gynecology Surgery (3)** Schneiderman and Staff  
Gynecology, obstetrics, and infertility evaluation in office practice. Care of hospitalized patients. Delivery and surgery.
- 390-95 **Extramural Obstetrics and Gynecology Elective (arr.)**  
Elective periods at other institutions



## Ophthalmology

Chair M.F. Armaly

### 381 Clinical Ophthalmology (arr.)

Armaly and Staff

Examination, diagnosis, and management of a wide variety of ocular conditions in ambulatory patients. Emphasis on conducting a general ophthalmic examination, recognition of abnormal findings, and management of common ocular diseases. Lectures, rounds, and seminars. Medical Faculty Associates.

### 382 Clinical Ophthalmology (arr.)

Sawyer

Examination, diagnosis, and management of a wide variety of ocular conditions. Emphasis on conducting a general ophthalmic examination, recognition of abnormal findings, and management of common ocular diseases. Lectures, rounds, and seminars. National Naval Medical Center.

### 383 Clinical Ophthalmology (3)

Ibrahim and Staff

Examination techniques, management decisions, follow up, and outcome of clinical entities. Observation, demonstration, and discussion with the clinical faculty. Group Health Association.

### 390-92 Extramural Ophthalmology Elective (arr.)

Elective periods at other institutions

## Orthopaedic Surgery

Chair R.J. Neviaser

### 302 Clerkship in Orthopaedic Surgery (3)

Labropoulos and Staff

Basic clinical rotation. Didactic sessions on physical diagnosis, X-ray interpretation, arthritis, trauma, and reconstructive surgery. Ward rounds, periods in emergency room or operating room, conferences. Night call is generally required. All affiliated hospitals.

### 380 Orthopaedic Surgery (5)

Bowd

Students participate in care of orthopaedic inpatients and outpatients, daily rounds, and conferences under the direction of a faculty member. Prerequisite: Orth 302. University Hospital and affiliated hospitals.

### 390-93 Extramural Orthopaedic Surgery (arr.)

Staff

Elective periods at other institutions. Prerequisite: Orth 302.

## Pathology

Chair H. Sidransky

Courses numbered 13 to 20 are open only to military personnel in the medical laboratory technique program.

### 13 Hematology (6)

Staff

Basic hematologic procedures, diagnosis of abnormalities of cellular elements of blood and bone marrow, studies in blood coagulation, quality control in clinical hematology.

### 14 Blood Banking (6)

Staff

Principles of immunohematology, blood donor center techniques, blood processing techniques, quality control in blood banking.

### 15 Clinical Laboratory Rotation (14)

Staff

Instruction in laboratory technique, stressing the application of theories and principles of clinical chemistry, microbiology, hematology, and blood banking in the clinical laboratory.

### 16 Clinical Chemistry (5)

Staff

Principles and techniques of blood chemistry analyses, including toxicological analyses for drugs of abuse and environmental poisons.

### 17 Urinalysis (2)

Staff

Principles and techniques of urine chemistry and microscopic analysis.

- 18 **Bacteriology (6)** Identification of pathogenic microorganisms by morphologic and cultural techniques. Staff
- 19 **Parasitology (4)** Identification of human parasites and their life cycles. Concentration methods, staining techniques, and media for culture. Staff
- 20 **Serology (2)** Principles and techniques of antigen-antibody reaction and immunological responses. Staff

Courses numbered 121 to 126, 130 to 133, and 140 are open only to students in the clinical year of the medical technology program

- 121 **Introduction to Medical Technology (4)** Orientation to laboratory medicine. Clinical chemistry, hematology, microbiology, and immunohematology. Lecture and laboratory. Path 121 is prerequisite to all other courses in the clinical year of the medical technology program. Silver, Smith
- 122 **Clinical Chemistry (5)** Lecture course in the principles and procedures involved in chemistry analysis of human blood and body fluids. Clinical correlations and pathological aspects of human disease. Prerequisite: Path 121. Staff
- 123 **Clinical Microbiology (2)** Lecture course in clinical microbiology, with emphasis on pathogenic characteristics, isolation, and identification of organisms related to human disease. Prerequisite: Path 121. Silver
- 124 **Immunohematology (1)** Lecture course in immunological aspects of transfusion of human blood. Emphasis on preparation and administration of blood components. Prerequisite: Path 121. Staff
- 125 **Clinical Hematology and Coagulation (2)** Lecture course in the laboratory detection, clinical correlation, and pathophysiology of human blood cell diseases and coagulation disorders. Prerequisite: Path 121. Smith
- 126 **Special Topics in Laboratory Medicine (2)** Principles of clinical parasitology, mycology, serology, laboratory management, and education techniques. Prerequisite: Path 121. Smith and Staff
- 127-28 **Pathology for Health Sciences Students (2-2)** for part-time students in the physician assistant program only. Same as Path 129. Kent
- 129 **Pathology for Health Sciences Students (4)** Lecture course. Basic concepts and language of pathology. Infectious diseases and fundamental disease processes. Emphasis on pathogenesis and dynamics of disease. Causation, evolution, and morphology of pathological changes in the principal diseases of each organ system, presented in coordination with clinical lectures in Idis 301. Kent
- 130 **Clinical Chemistry Practicum (4)** Rotation through the University Hospital clinical chemistry laboratory. Prerequisite: Path 121. Silver
- 131 **Clinical Microbiology Practicum (4)** Rotation through the University Hospital clinical microbiology, mycology, virology, and parasitology laboratories. Prerequisite: Path 121. Silver
- 132 **Hematology, Coagulation, and Urinalysis Practicum (4)** Rotation through the University Hospital clinical hematology, coagulation, and urinalysis laboratories. Prerequisite: Path 121. Silver
- 133 **Blood Bank and Serology Practicum (4)** Rotation through the University Hospital blood bank and serology laboratory. Prerequisite: Path 121. Staff
- 140 **Independent Study in Medical Technology (arr.)** Intensive review of medical technology, with assigned readings and participation in selected courses in the medical technology program. Registration by petition. Smith
- 152 **Introduction to Basic Laboratory Medicine (2)** Theory, performance, and interpretation of routine clinical laboratory tests done in a physician's office, such as complete blood counts with differentials, urinalysis, and microbiological culture and staining techniques. Lectures, demonstration, and laboratory. Prerequisite: Path 127-28.



- 201-2 **Pathology (4-4)** Kent and Staff  
A year-long course, required for second-year medical students. General introduction to concepts of disease. Pathology of organ systems, correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies.
- 217 **Gross Autopsy Pathology (1)** Orenstein and Staff  
Review of current necropsy cases, with emphasis on the correlation of gross changes in the organs and the clinical history. Limited to second-year medical students. University Hospital.
- 220 **Medical Mycology (2-4)** Al-Doory  
Lecture and laboratory course covering pathogenic fungi, mycotic diseases, and their clinical aspects.
- 222 **Opportunistic Mycoses (2)** Al-Doory  
Study of the opportunistic fungal infections and their serological, clinical, and therapeutic aspects. Emphasis on identification of fungi and evaluation of laboratory findings.
- 261 **Seminar in Experimental Pathology (1)** Sidransky  
Current topics in research in experimental pathology. Limited to second-year medical students.
- 266 **Comparative Pathology I (1)** Zook  
Participation in an autopsy service involving captive wild animals. Comparison of diseases in various animal species with those in humans. Limited to second-year medical students. Pathology Laboratory, National Zoological Park.
- 270 **Medical Mycology (1)** Al-Doory  
Review of major mycotic diseases, with emphasis on opportunistic mycoses. Limited to second-year medical students.
- 284 **Ophthalmic Pathology (arr)** McLean and Staff  
Participation in an active service limited to pathology of the eye and its adnexa, particularly inflammatory, degenerative, and neoplastic diseases. Armed Forces Institute of Pathology.
- 286 **Perinatal Pathology (arr)** Kent  
Focuses on important disorders that may beset the human fetus and the newborn infant. Emphasis on the role of placental abnormalities. Prerequisite: Path 203, 204, and permission of instructor.
- 289 **Clinical and Anatomical Pathology (arr)** Cook and Staff  
Designed to familiarize the student with the operation of the pathology department in a community hospital. Student may elect to concentrate in a specialized area or to study only anatomical pathology. A nuclear medicine elective is also available. Fairfax Hospital.
- 290-92 **Extramural Pathology Elective (arr)**  
Elective periods at other institutions.
- 296 **Surgical Pathology (arr)** Silverberg and Staff  
Evaluation of surgical specimens and correlation with clinical status of patient. Description of gross and microscopic findings on assigned cases. University Hospital.
- 298 **Autopsy Pathology (arr)** Orenstein, Kent  
Organ changes in disease, gross and microscopic correlation, preparation of protocols. Participation in autopsy pathology service. University Hospital.
- 301 **Clinical and Anatomical Pathology (arr)** B. Smith and Staff  
Opportunity to explore in depth a topic selected from the field of pathology. Assigned readings. V.A. Hospital.
- 302 **Forensic Pathology (arr)** Okage  
Experience in the Office of the Chief Medical Examiner of the District of Columbia. Observation of death scene investigation techniques, medical-legal autopsies, and related toxicological laboratory analyses, attendance at court trials, and participation in the various conference activities of the agency.
- 320 **Transfusion Medicine (arr)** Simpson  
Didactic sessions, guided reading assignments, clinical consultations, laboratory bench work, and weekly conferences provide structured introduction to basic principles of transfusion medicine, including clinical and laboratory indications for use of blood components, diagnosis, management, and prevention of adverse transfusion reactions, and basic immunohematology and blood groups.

321 **Clinical Pathology/Laboratory Medicine** (arr.)

Wilkinson

Rotations through clinical chemistry, hematology, microbiology, and transfusion medicine (blood bank) laboratories providing guided readings, laboratory experience, didactic presentations, weekly conferences, and opportunities for clinical consultation. Basic principles of laboratory technology applied to the diagnosis and management of clinical disorders, with special focus on the appropriate interpretation of laboratory data.

322 **Blood Bank and Transfusion Medicine** (arr.)

Cook

Participation in consultative activities of a transfusion medical service including therapeutic apheresis, investigation of transfusion reactions, immunohematology problems, and component therapy. The collection, preparation, processing, and storage of blood and blood components.

501 **Selected Topics in Pathology** (3)

Kent and Stahl

Guided readings, study, and/or laboratory experience in an aspect of pathology of particular interest to students. Students present a report on the specific topic.

800 **Summer Remedial: Pathology** (8)

Kent

**Pediatrics***Interim Chair G. Avery*303 **Pediatric Clerkship** (10)

Greenberg

Required for medical students. Full-time experience as part of resident team. Ward rounds, work in outpatient department and specialty clinics under staff supervision, lectures, clinical conferences, grand rounds. Includes child psychiatry and child guidance. Eight week periods throughout the academic year. Children's Hospital.

360 **Clinical Pediatrics Acting Internship: Adolescent Unit** (5)

Einhorn

Four-week elective periods. Children's Hospital.

361 **Clinical Pediatrics Acting Internship: Infectious Diseases** (5)

Einhorn

Four week elective periods. Children's Hospital.

362 **Clinical Pediatrics Acting Internship: General Medicine** (5)

Einhorn

Children aged 2 months to 3 years. Four-week elective periods. Children's Hospital.

363 **Clinical Pediatrics Acting Internship:**

Einhorn

**Inpatient Hematology/Oncology** (5)

365 **Clinical Pediatrics Acting Internship: General Pediatrics** (5)

Campbell

Children aged 3 to 12 years. Four-week elective periods. Children's Hospital.

366 **Mental Retardation** (arr.)

Battle

Review of etiologic factors, clinical manifestations, seizures, disorders, therapeutic and preventive aspects, sociological problems, and restorative and rehabilitative approaches to chronic disease/disorder. Experience in a medical care delivery program and three educational programs for the retarded. Hospital for Sick Children.

373 **Pediatric Urology** (arr.)

Belman

Experience in treatment of inpatients and outpatients, including assessment, diagnostic evaluation, and surgery. Four-week elective periods. Children's Hospital.

375 **Pediatric Surgery** (arr.)

Newman and Staff

Supervised participation in surgical service for infants and children, including newborn surgery and surgery for trauma and neoplasms. Children's Hospital.

376 **Pediatric Neurology** (5)

Packer

Inpatient and outpatient management of children with a variety of neurologic disorders. Experience in the gamut of diagnostic procedures. Participation in regularly scheduled clinical rounds, conferences, and seminars is encouraged. Children's Hospital.

378 **Genetics** (5)

Rosenbaum

Principles of basic human genetics, with emphasis on the dysmorphic child, chromosomal aberrations, and genetic counseling. Opportunity to work in the genetic laboratory and to learn chromosomal techniques. Four-week elective periods. Children's Hospital.



- 379 **Pediatric Intensive Care (arr.)** Holbrook and Staff  
Pathophysiology and treatment of life-threatening illnesses, conditions, or injuries in childhood. Supervised patient responsibility. Children's Hospital
- 380 **Development Disabilities (arr.)** Battle  
Theoretical issues of development, clinical appraisal, and intervention strategies for disability in vision, audition, motor functions, cognition, language, feeling, and affective development. Includes review of normal development in all areas. Weekly reading assignments, written projects, and discussion sessions. Hospital for Sick Children
- 381 **Pediatric Allergy and Immunology (5)** Sly, Slater  
Introduction to pediatric allergy and clinical immunology: clinics and wards. Some experience in experimental techniques, pulmonary function testing, and objective methods of clinical evaluation. Children's Hospital
- 382 **Pediatric Radiology (arr.)** Kushner and Staff  
Participation in conferences and observation in the department. Conventional and newer, nonconventional body imaging techniques are stressed. Children's Hospital
- 383 **Pulmonary Medicine (arr.)** Fink  
Introduction to SIDS and sleep apnea program, pulmonary function testing, and fiber-optic bronchoscopy. Diagnostic and therapeutic procedures. Pulmonary and nutritional manifestations and complications in cystic fibrosis patients, from new borns to those in their third decade. Medical, surgical, psychological, and social problems of cystic fibrosis patients and their families. Children's Hospital
- 386 **Pediatric Hematology/Oncology (5)** Rearman and Staff  
Clinical course on the diagnosis and management of children with hematologic and oncologic diseases. Laboratory experience, including examination of peripheral blood smears and bone marrow aspirates and interpretation of laboratory tests. Four-week elective periods. Children's Hospital
- 387 **The Chronically Ill Child and Family in the Community (arr.)** Battle  
Emphasis on care provided children with chronic illnesses in the hospital and in the community. Introduction to the health team concept and preparation to serve as part of an interdisciplinary health care team. Contact with nurses, allied health professionals, and other team members. Focus on the biosocial aspects of care and on improving the functioning of children with chronic illness, rather than on specific diseases. Hospital for Sick Children
- 388 **Newborn Medicine (arr.)** Avery and Staff  
Observation and experience in the intensive care of infants. Four-week elective periods. Children's Hospital
- 389 **Pediatric Cardiology (5)** Hougen and Staff  
Physical diagnosis of congenital and acquired heart diseases, interpretation of electrocardiograms and vectorcardiograms, cardiac catheterizations. Four-week elective periods. Children's Hospital
- 390-95 **Extramural Pediatric Elective (arr.)**  
Elective periods at other institutions
- 396 **Approach to Care of Child with Handicapping Conditions (arr.)** Battle  
Multidisciplinary approach to care of children with multiple handicaps, developmental delay, and/or chronic illness, in clinical assessments, therapy sessions, and interdisciplinary conferences. Reaction and behavior of the child, family and staff are explored. Weekly reading assignment, written projects, and discussion sessions. Hospital for Sick Children
- 397 **Pediatric Nephrology (arr.)** Bock and Staff  
Emphasis on clinical pediatric nephrology of inpatients and outpatients. Opportunities for evaluation of new referrals for renal problems and the management of known renal disease in children. Research opportunities are available in immunologic causes of renal disease, complement abnormalities, vitamin D metabolism, acid-base physiology, and renal physiology, but clinical aspects of the program are stressed. Children's Hospital
- 399 **Ambulatory Adolescent Medicine (5)** Silber and Staff  
Outpatient clinic experience in diagnosis and management of adolescent problems, under supervision of senior staff and fellows. Participation in consultative clinics, multidisciplinary interviewing conferences, medical teaching conferences, adolescent grand rounds, and twice weekly conferences with director of outpatient management and department chair. Children's Hospital

- 400 **Pediatric Laboratory Medicine** (arr.) Campos and Staff  
Laboratory studies of infants and children correlated with clinical disease. In-depth review of laboratory diagnostic studies. Four-week elective periods. Children's Hospital.
- 401 **Pediatric Otolaryngology** (5) Milmoie and Staff  
Otoscopy examination of infants and children. Management of common middle ear disorders. Evaluation of stridor and airway compromise. Children's Hospital.
- 403 **Pediatric Rehabilitation** (arr.) Koch and Staff  
Acute and chronic disabling disorders in infants and children. Normal neuromuscular development and physical examination, with emphasis on posture and movement. Electrodiagnostic techniques and the use of non-M.D. therapists in rehabilitation. Observation of pathologic states referred for treatment, including the prescription of braces and adaptive equipment. Children's Hospital.
- 404 **Being an Effective Teacher** (3) Greenberg  
Theory of problem solving, learning of preference styles, and interpersonal skills that affect teaching. Assigned readings and assessment of teaching and learning styles and teaching effectiveness. Children's Hospital.
- 501 **Embryologic Basis of Congenital Malformation** (3) Newman  
The embryogenesis of congenital defects and the principles underlying their diagnosis and surgical correction. Lectures, seminars, and readings. Children's Hospital.

## Pharmacology

Chair H.G. Mandel

- 110-11 **Pharmacological Basis of Anesthesia** (4-4) Mazel and Staff  
For students in nursing anesthesia. Principles of pharmacology, drugs affecting the autonomic nervous system, central nervous system, and cardiovascular system; fundamentals of inhalation anesthesia, auxiliary drugs used in anesthesiology; endocrines, cancer chemotherapy, other topics.
- 114 **Drugs and the Consumer** (3) Cohn and Staff  
General concepts of drug action in the body. Action mechanism of some specific prescription and nonprescription drugs, including contraceptives; tranquilizers, and sleep-inducing drugs, hay fever, headache, and cold remedies; analgesics, antibiotics, vitamins. Issues related to development and marketing of drugs, drug safety, drug advertising, generic versus trade-name drugs, drug use in sports, drug use during pregnancy, smoking and health. Limited enrollment.
- 115 **Nonmedical Use of Licit and Illicit Drugs** (3) Cohn and Staff  
Psychological and sociological bases of recreational and other nonmedical use of drugs, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to the nonmedical use of drugs, and prevention and treatment of drug dependence. Lectures and discussions on alcohol, narcotics, central nervous system stimulants, and depressants, marijuana, and hallucinogenic and psychedelic drugs.
- 120 **Readings in Pharmacology for Anesthesia** (arr.) Mazel and Staff  
For students in nursing anesthesia. Assigned readings in anesthesia and related areas; preparation of reports.
- 124-25 **Chemistry and Physics of Anesthesia** (3-3) Mazel and Staff  
For students in nursing anesthesia. Basic concepts of physics, general chemistry, organic chemistry, biochemistry, and their application to medicine and anesthesiology, including chemistry of respiration, acid-base balance, clinical biochemistry, and enzymology, hormones, radioisotopes, electronics, and physicochemical properties of anesthetic agents.
- 130 **Seminar: Accessory Drugs in Anesthesia** (2) Mazel and Staff  
For students in nursing anesthesia. Pharmacology and pharmacodynamics of accessory anesthetic drugs, with emphasis on those areas not covered in Pharm 110-11.
- 158 **Pharmacology for Health Sciences Students** (4) Suraw and Staff  
Drug disposition, Autonomic nervous system, cardiovascular, and gastrointestinal drugs. Psychopharmacology. Analgesics, sedatives, anticonvulsants. Chemotherapy, toxicology, endocrinology. Prerequisite: Anat 115, Phys 111, or equivalent.



- 159 Introduction to Pharmacology I (3)** Straw  
For part-time students in health sciences programs. Includes all topics covered in Phar 158 except gastrointestinal drugs, anticonvulsants, and endocrinology. Students who receive credit for Phar 158 may not receive credit for Phar 159 or 160. Prerequisite: Anat 115, Phys 111, and permission of instructor.
- 160 Introduction to Pharmacology II (1)** Straw  
Continuation of Phar 159 for part-time students in health sciences programs. Gastrointestinal drugs, anticonvulsants, and endocrinology. Students who receive credit for Phar 158 may not receive credit for Phar 159 or 160. Prerequisite: Phar 159 and permission of instructor.
- 170 Introduction to Pharmacology and Toxicology (3)** Staff  
The absorption, distribution, metabolism, and excretion of drugs and toxic substances. Mechanisms of toxicity. Same as PubH 170.
- 191 Respiratory Care (3)** Mazel and Staff  
For students in nursing anesthesia. Advanced techniques for care of patients requiring total respiratory support. Same as Anes 191.
- 201-2 Pharmacology (6-2)** Mandel and Staff  
Required for second-year medical students. Lectures, laboratory, and conferences on interaction of drugs and biological systems as a basis for rational disease therapy. Prerequisite: Bioc 201, Phys 201, 212.
- 207 Pharmacology for Health Sciences Students (4)** Straw and Staff  
Same as Phar 158 but with additional course requirements. Primarily for students in the graduate program in primary care nursing offered in collaboration with George Mason University.
- 254 Frontiers in Pharmacology (1)** Klubes  
Recent advances and research in pharmacology. Presentations by laboratory scientists from neighboring institutions.
- 258 Cancer Chemotherapy (1)** Mandel and Staff  
Seminars and lectures by scientists involved in current research on cancer and cancer chemotherapy.
- 259 Readings: Cancer and Cancer Chemotherapy (2)** Staff  
Selected readings and discussion of recent advances in cancer and cancer chemotherapy research. Prerequisite: Phar 201 or 205.
- 260 Endocrine Pharmacology (1)** Staff  
Lectures and seminars on recent advances in the pharmacology and mechanism of action of various hormones.
- 272 Physiological Disposition of Drugs (3)** Cohn  
Mechanisms for the absorption, distribution, metabolism, and excretion of drugs and the physical, chemical, and biological factors affecting these processes are studied through extensive reading of classical and current literature. Prerequisite: Bioc 221-22, Phar 203, or permission of instructor.
- 285 Readings in Pharmacology (arr.)** Mandel  
Assigned reading and preparation of reports.
- 286 Research in Pharmacology (arr.)** Mandel  
Participation in experimental studies in pharmacology, particularly neuropharmacology, cancer chemotherapy, or drug metabolism.
- 287 Readings in Drug Abuse Literature (arr.)** Cohn  
Professional and nonprofessional literature on drug dependence. Informal luncheon discussions or assigned reading and preparation of a report.
- 290-291 Extramural Pharmacology Elective (arr.)** Staff  
Elective periods at other institutions.
- 295 Reading and Research (arr.)** Mazel  
May be repeated for credit.
- 501 Readings in Pharmacology (arr.)** Mandel and Staff  
Readings, discussions, and/or preparation of report. Student can choose to work with one or more faculty members in the department on a topic of mutual interest.
- 502 Clinical Use of Drugs (3)** Cohn and Staff  
Discussion of the rational use of drugs in the treatment of disease. Independent reading and study.
- 503 Drug Dependence: Basic and Clinical Aspects (3)** Cohn and Staff  
Seminars and discussion on various aspects of drug and chemical dependencies, such as recognition and diagnosis of dependence, the role of drugs in treating

dependence: fetal alcohol syndrome and the addicted neonate: recent research on marijuana, cocaine, PCP, and other drugs and treatment of the drug overdose emergency. Independent reading and study.

800 Summer Remedial: Pharmacology I (6)

801 Summer Remedial: Pharmacology II (2)

Mandel  
Mandel

## Physiology

*Interim Chair* D.W. Watkins

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses numbered above 201, except Phyl 205, 212, and 221

- 111 **Physiology for Health Sciences Students (4)**  
For students in the physician assistant and nursing anesthesia programs. Function and process of the human body, covering the major organ systems. *Staff*
- 191 **Selected Topics in Human Structure and Function (5)**  
Structural and functional basis of physiology. Required for graduate students who have not had Anat 201 or equivalent. Students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: Bios 11-12 or equivalent and consent of instructor. Open to Columbian College students with approval of advisor. *Kenner*
- 201 **Physiology (8)**  
Required for medical students, open to graduate students. Cellular organ system and applied human physiology. Prerequisite for graduate students: Anat 201 or Phyl 191 or equivalent. Bios 221 or Phyl 205 or consent of department chair. Concurrent registration: Phyl 212. Open to consortium students only with permission of department chair. *Staff*
- 253 **Physiology of Fluid Balance and Hydrogen Ion Regulation (2)**  
Discussion of principles of fluid and acid-base balance and their applications. (Fall) *Cassidy*
- 262 **Topics in Cardiovascular Physiology (2)**  
Survey, at an advanced level, of aspects of cardiovascular physiology, especially as interrelated with the respiratory and renal systems. *Kenner*
- 269 **Topics in Neurophysiology and Psychophysiology (2)**  
Selected topics in contemporary neurophysiology including methods of data collection and analysis, control mechanisms involved in movement and behavior and sensory processing. Admission by permission of instructor. *Lavine*
- 282 **Experimental Physiology (arr.)**  
Participation in an ongoing research program in the department. Programs currently available in membrane physiology, intestinal transport, neurophysiology and cardiovascular physiology. *Staff*
- 290-91 **Extramural Physiology Elective (arr.)**  
Elective periods at other institutions. *Staff*
- 295 **Research (arr.)**  
By special arrangement with individual staff members. Approximately four hours per week in the laboratory for each credit hour of credit. May be repeated for credit. *Staff*
- 298 **Comprehensive Physiology (arr.)**  
Guided review of selected areas of physiology appropriate to the student's graduate program. Prerequisite or concurrent registration: Phyl 221. *Staff*
- 502 **Structural-Functional Correlations in GI Disease (arr.)**  
Morphological methodology, technique in the diagnosis and prognostic evaluation of gastrointestinal disease states such as ulceration, colitis, Hirschsprung's disease, colorectal carcinoma, and pancreatic malfunction. Techniques considered include traditional light microscopy, scanning and transmission electron microscopy, and immunocytochemistry. Selected readings and discussion. *Cassidy*
- 503 **Advanced Physiology (arr.)**  
Guided readings, study, and/or laboratory experience at an advanced level in a subfield of physiology. *Watkins*
- 800 **Summer Remedial: Physiology (8)** *Staff*



## Psychiatry and Behavioral Sciences

Chair J.M. Wiener

- 210 **Death and Dying (1)** Perlin, Akman  
Consideration of issues related to death and dying, including care and assessment of the terminally ill, hospice care, rights of the dying patient, suicide, and survivorship and bereavement. Special section on AIDS.
- 211 **Introduction to Clinical Psychiatry (2)** Sanders and Staff  
In-depth study of topics in psychiatry of interest to students. Students meet with faculty to discuss readings and research and, on occasion, interview patients in the hospital. Topics regularly include psychoanalysis, eating disorders, consultation liaison, death and dying, and child psychiatry.
- 212 **Application of Psychoanalytic Principles to the Practice of Medicine (1)** Staff  
Special course designed for medical students by the extension division of the Washington Psychoanalytic Institute, taught by a practicing psychoanalyst.
- 213 **Identity and Role of the Physician (1)** Rubinstein  
Didactic material combined with experimental models, including group dynamics. Emphasis on issues of concern to women.
- 215 **Individual Student Preceptorship (1)** Wiener and Staff  
First- and second-year medical students may arrange individual preceptorships other than those listed, with permission of department chair.
- 252 **Biopsychosocial Model in Medical Practice (3)** Walsh and Staff  
Required for medical students. Basic principles of the doctor-patient relationship. Analysis of psychological growth and development, family process, and the personality of the physician as they influence everyday medical practice.
- 301 **Psychopathology and Conceptual Models (2)** Sanders and Staff  
Required for second-year medical students. Mental mechanisms, psychopathology, introduction to psychiatric syndromes, clinical interviewing, and behavioral sciences in clinical medicine.
- 302 **Clinical Clerkship (10)** Akman and Staff  
Required for medical students. Supervised examination, diagnosis, and outpatient and inpatient treatment at University St. Elizabeths, Children's, and V.A. Hospitals, Northern Virginia Mental Health Institute, and Psychiatric Institute of Washington. Case conferences, seminars on psychiatric referral, "psychiatric" drugs, and community resources, with emphasis on psychiatry in general practice.
- 381 **Clinical Psychiatry (arr.)** Akman  
Participation as acting intern in one or more of the psychiatry services of GW Medical Center: inpatient and emergency, outpatient, consultation liaison, and oncology liaison. Assignments are based on student preference if possible. A rotation of at least eight weeks is preferable for supervised psychotherapy experience. Four week elective emphasizes diagnostic assessment and brief treatment modalities.
- 385 **Psychiatric Research Elective (arr.)** Kirch  
Participation in ongoing laboratory and clinical research in the neurosciences. Publication expected. National Institute of Mental Health.
- 386 **Research and Clinical Approaches to Families of Medical Patients (arr.)** Steinglass and Staff  
Introduction to theory, method, and techniques of clinical and research evaluation of families of medical patients, with emphasis on family factors that favor or retard the patient's recovery from serious medical illness. Completion, under supervision of a small independent project on a topic of student's choice.
- 388 **Child and Adolescent Psychiatry (arr.)** Bailey and Staff  
Experience as an acting intern in child psychiatry. Consultation to pediatric wards, outpatient evaluation and treatment of selected patients and their families, and/or inpatient child and adolescent services, eight weeks required for specialized experience in all three areas. Individualized program by arrangement. When possible, assignments are based on student's preference and prior experience. Children's Hospital.
- 391-393 **Extramural Psychiatry Elective (arr.)**  
Elective periods at other institutions.

397 **Schizophrenic and Borderline Conditions (5)**

Participation in and study of treatment and administrative management of patients. Participation in staff meetings. Individual supervision and selected readings. Chestnut Lodge, Rockville, Maryland.

406 **Psychiatric Education, Research, and Administration (arr.)**

Student preceptorship, practicum experience, instruction in theory, participation in research, and individual project. Direct supervision by and close working contact with director and staff of office of education of national specialty society. Individualized program in areas such as women in medicine, psychiatric education, manpower development relevant to health care delivery, continuing education, federal and legislative affairs, health planning, and relation of medical education to practice.

409 **Independent Study (arr.)**

Individualized study, clinical training, or research experience selected on the basis of the student's interests and available resources. Topics may include death and dying, suicide, medical ethics, depression, or other issues in psychiatry and behavioral science. Must be arranged prior to registration.

800 **Summer Remedial: Medical Practice (3)**801 **Summer Remedial: Conceptual Models (2)**

## Public Health

With the exception of PubH 170, 208, 270, 271, and 272, public health courses are open only to students in the M.P.H. program or with permission of the MPH program director.

170 **Introduction to Toxicology and Pharmacology (3)**

Same as Phar 170. Credit does not apply to the M.P.H. degree. (Fall)

201 **Epidemiology-Preventive Medicine (3)**

Principles of epidemiology and preventive medicine, including rates of disease; principles of screening, and descriptive epidemiology. Population dynamics and special populations, including consideration of maternal and child health and geriatrics. Applications to infectious and chronic diseases and to environmental and occupational health. (Fall)

202 **Biostatistical Applications for Public Health (3)**

Application of biostatistical principles to critical analysis of retrospective and prospective studies, controlled clinical trials, and reports in the health services literature. Selection, basic calculations, and interpretation of statistical methods. (Fall)

203 **The Scientific Basis of Public Health (3)**

Principles of pathophysiology as applied to public health, with emphasis on the scientific basis of public health. Credit does not apply to the MPH degree. (Summer)

204 **Bioethics and Health Behavior (1)**

For students in the joint M.D.-M.P.H. program. Current issues in health policy and bioethics. Prerequisite: HCS 369. (Fall)

205 **Health and Society (arr.)**

Issues related to the health of the public considered from the viewpoints of economics, law, political science, sociology, history, and biomedical ethics. Same as HSMP 267. (Summer)

206 **Colloquium in Health Policy (1)**

Seminars and lectures by experts in health policy. Content changes each year. (Spring)

208 **Introduction to Preventive Medicine (3)**

Introduction to the biological basis of preventive medicine, including aspects of nutrition, human reproduction and development, immunology, microbiology, and therapeutics. Open to seniors with permission of the instructor. Credit does not apply to the MPH degree. (Fall)

211 **Economics of Health Care (3)**

Principles of microeconomics applied to health care delivery and health policy, including discussion of incentive systems, markets and competition, regulation, and the economics of health care technology. Same as HSMP 262. (Fall and summer)



- 213 **Administration of Health Systems (3)** Crum and Staff  
Application of management and organization theory to issues of health services delivery, institutional leadership and governance, and management of conflict and change. Same as HSMP 260. (Fall and summer)
- 214 **Health Planning and Marketing (arr.)** Reeves and Staff  
Strategic planning, marketing, policy analysis, and evaluation techniques for health care delivery services. Prerequisite: PubH 213, corequisite: PubH 263 Same as HSMP 264. (Spring)
- 220 **Decision Making in Clinical Epidemiology and Public Health (2)** Riegelman and Staff  
Quantitative and qualitative approaches to decision making, including risk-benefit analysis, decision analysis, and cost-effectiveness analysis. Applications to technology assessment, development of clinical guidelines. Prerequisite: PubH 201. (Spring)
- 221 **Occupational-Environmental Health (2)** Staff  
Principles of occupational-environmental health, including assessment of exposure leading to risk of disease. Introduction to occupational-environmental toxicology and adverse health outcomes. Legal, social, and ethical issues. (Spring)
- 222 **Case Studies in Promotion-Disease Prevention (2)** Staff  
Principles of epidemiology applied to primary and secondary prevention in clinical and public health settings. Case studies illustrating the development of recommendations and practical issues of implementation. Prerequisite: PubH 201, 202 (Summer)
- 223 **Implementing Preventive Medicine (1)** Davis and Staff  
Practical application of principles of preventive medicine to programs in clinical, occupational, and public health settings. Prerequisite: PubH 201, 202 (Summer)
- 225 **Developing National Health Services Policy (3)** Staff  
Understanding and analyzing the processes by which health services policy is formulated and implemented at the federal level. Focus on Congress, the presidency, and the agencies. Same as HSMP 225. (Spring)
- 226 **Health Behavior and Health Education (3)** Staff  
Principles of psychology and learning theories applied to the analysis of issues in health promotion and disease prevention with national and international applications. (Spring)
- 230 **Computer Applications for Public Health (3)** Staff  
Use of computers in management of health data. Laboratory instruction in use and application of software packages, including database and spreadsheet software. Admission by permission of instructor. (Spring)
- 231 **Methodology of Occupational and Environmental Health (3)** Hunting and Staff  
Epidemiologic methods used in studies of occupational and environmental health. Topics include more detailed elements of toxicology and technical aspects of environmental assessment. Prerequisite: PubH 201, 202; prerequisite or corequisite: PubH 221. (Spring)
- 233 **Biostatistics for Public Health (2)** Staff  
Selection, basic calculations, and interpretation of statistical methods applicable to public health, including an introduction to epidemiological analysis, analysis of variance, correlation, and regression. (Spring)
- 240 **Design of Health Studies (3)** Hirsch  
Skills-oriented course, stressing design of investigations. Methods of obtaining samples, design and evaluation of data collection instruments, and development of protocols, proposals, and manuals of procedures. Prerequisite: PubH 202 (Spring)
- 241 **Occupational and Environmental Health Policy (3)** Foran  
Development and implementation of policies and regulations. Principles of risk assessment and risk communication. Case studies of recent policy decisions in occupational and environmental health. Prerequisite: PubH 221, 231 (Summer)
- 242 **Environmental Toxicology (2)** Foran  
Sources, fate, transport and effects of toxic substances on plants and animals and, ultimately, humans. Prerequisite: PubH 201, 202, prerequisite or corequisite: PubH 221 (Spring)

- 243 Occupational-Environmental Health Assessment (2)** Staff  
Assessment of disease that is secondary to occupational-environmental exposure: prevention, surveillance, and therapy. Prerequisite: PubH 201, 202; prerequisite or corequisite: PubH 221. (Spring)
- 244 Evaluation of Health Education and Service Delivery Programs (1)** Staff  
Methods for evaluation of health education and service delivery programs directed toward changes in health behavior. Builds on previous course work in study design. Prerequisite: PubH 226, 231, or 241. (Summer)
- 251 Use of Statistical Packages for Data Analysis (3)** Schechtman  
Computer applications for statistical analysis of health data. Laboratory instruction in use and applications of statistical packages. Prerequisite: PubH 202. (Spring)
- 255 Advanced Epidemiologic Methods (3)** Staff  
Advanced topics in epidemiological research, including examination of the effects of bias. Application and interpretation of multivariable methods of analysis. Prerequisite: PubH 201, 240. (Summer)
- 263 Health Services Financial Management (3)** Eastaugh  
Introduction to the management of resources and administration of funds for health services institutions and agencies. Financial analysis, management of plant and equipment, containment of costs, and safeguarding of assets. Preparation of budgets, financial statements, and reports. Prerequisite: PubH 211. Same as HSM 263. (Spring)
- 265 Health Law (3)** Budem  
Aspects of the legal system that affect public health and health services delivery. Study of the administrative process in regulatory agencies. Torts, contracts, insurance, labor relations, legal problems involved in the control of contagious diseases. Litigation procedures that relate to the public health specialist. Same as HSM 265. (Spring)
- 270 Introduction to International Health (3)** Rodriguez-Garcia and Staff  
The multidimensional aspects of international health and the medical, economic, and sociocultural aspects of disease. Overview of the major causes of morbidity and mortality on a regional basis. Issues in development, family health, ethics, and social change; approaches to the delivery of health care services. Open to seniors with permission of instructor. Credit for this course does not apply to the M.P.H. degree. (Fall)
- 271 Issues in International Health (3)** Rodriguez-Garcia and Staff  
International health policy and its relationship to social and economic development. Foundations of systematic policy analysis, the political processes, implementation, and relationship of international health and development policy. Issues of appropriate health technology, maternal and child health, aging, and AIDS. Prerequisite: PubH 270. Credit for this course does not apply to the M.P.H. degree. (Spring)
- 272 International Health Project Seminar (3)** Rodriguez-Garcia and Staff  
Students select and investigate an area in international health or development through contact with international agencies and organizations. Students develop policy proposals or analyses as case studies. Prerequisite: PubH 270, 271, or consent of instructor. Credit for this course does not apply to the M.P.H. degree. (Summer)
- 280 Special Projects in Epidemiologic Methods (4)** Staff  
Under faculty supervision, the student undertakes an original project that applies the skills and knowledge gained in epidemiologic methods to a professional setting. Prerequisite: PubH 201, 202. (Fall, spring, and summer)
- 281 Special Projects in Health Promotion-Disease Prevention (3)** Staff  
Under faculty supervision, the student undertakes an original project in health promotion-disease prevention that applies the skills and knowledge gained in the M.P.H. program. Prerequisite: PubH 201, 202. (Fall, spring, and summer)
- 282 Special Projects in Biostatistics (3)** Staff  
Supervised biostatistical analysis as part of the research collaboration service. Students perform an original analysis of research data, using skills and knowledge gained in the M.P.H. program. Prerequisite: PubH 201, 202; Stat 157; corequisite: PubH 240, Stat 121, 158. (Fall, spring, and summer)
- 284 Special Projects in Occupational-Environmental Health (3)** Staff  
Under faculty supervision, the student undertakes an original project in occupational-environmental health that applies the skills and knowledge gained in the M.P.H. program. (Fall, spring, and summer)



- 287 **Case Studies in Administrative Medicine** (arr.) Staff  
Analyses of problems and policies in health systems administration. Prerequisite: PubH 214, 263, 265. Same as HSMP 268. (Summer)
- 288 **Health Policy Applications** (3) Staff  
Methods for systematic health policy analysis, including quantitative and qualitative approaches. Students complete a project that applies the skills and knowledge gained in the MPH program. Prerequisite: PubH 211, 225; prerequisite or corequisite: PubH 251. (Spring)
- 290 **Topics in Health Policy** (1) Staff  
In-depth examination of a particular facet of health policy. Topics vary. Prerequisite: PubH 202, 211, 213; corequisite: PubH 251. (Summer)
- 291 **Advanced Topics in Biostatistics** (1) Staff  
For students in the biostatistics option of the M.P.H. program. Prerequisite: PubH 201, 240; Stat 121, 157, 158. (Summer)
- 293 **Topics in Epidemiology and Preventive Medicine** (1) Staff  
In-depth examination of a particular facet of epidemiology or preventive medicine. Topics vary. (Summer)
- 294 **Topics in Occupational and Environmental Health** (1) Staff  
In-depth examination of a particular facet of occupational and environmental health. Topics vary. (Summer)
- 299 **Independent Study** (3) Staff  
Permission of program director required.

## Radiology

Acting Chair D O Davis

Courses numbered 10 to 198 are open only to degree candidates in radiologic health sciences programs. The following courses are open only to off-campus students: Rad 40-41-42, 50, 51, 60, 61, 62, 70, 71, 80, 90, 95, 96, 97, 99, 100.

- 10 **Ethics in Radiation Therapy and Nuclear Medicine Technology** (1) Staff  
Ethical issues related to the technologist's work with physicians and patients, including moral and legal responsibilities and the rapport expected of the technologist.
- 11 **Introduction to Radiation Therapy Technology** (3) Staff  
Introduction to hospital and departmental organization; roles and functions of the radiation therapy technologist. Emphasis on principles of radiation therapy treatment and procedures used in the treatment of cancer patients, including basic principles of patient care and nursing procedures.
- 12 **Patient Care and Management** (2) Staff  
Emphasis on patient care and aseptic techniques as they relate to the radiology service. Fundamental concepts of the dying process, including attitudes and experiences.
- 14 **Radiation Physics** (2) Staff  
Basic course in physics for students in the radiation therapy technology program. Standards of measure, metric measurement, laws of motion, weight, work, power, energy, and momentum. Introduction to the structure of matter, atomic and nuclear structure, periodic tables, chemical bonding, material and artificial radioactivity, decay schemes. Electrostatics and magnetism.
- 15-17-18 **Radiation Therapy Physics, Dosimetry, and Safety I-II-III** (2-2-2) Staff  
Concepts of interaction of radiation with matter. Techniques of treatment planning, including concepts of linear source, dosimetry, and computer treatment planning. Introduction to the dosimetry of electrons and neutrons. Concepts of radiation detection and safety as applied to radiation therapy, including effects of time, distance, and shielding.
- 19 **Radiation Pathology** (2) Staff  
Basic concepts of pathology. Emphasis on tumor pathogenesis and the biological and pathological effects of ionizing radiation in living organisms.
- 20-21 **Radiation Therapy Techniques and Oncology I-II** (3-3) Staff  
Management of patients with a variety of malignant diseases by radiotherapeutic techniques. Preparing the patient for treatment, patient positioning, and immobilization techniques.

- 23 **Clinical Experience (1 to 4)** Staff  
Students are assigned to a local health facility for 4 to 12 hours per week during the fall and spring semesters. Observation and some participation in the management of the patient undergoing radiation therapy.
- 24 **Anatomy and Physiology Overview (1)** Staff  
Review of the structure, function, and processes of the human body; major organ systems are considered.
- 25 **Quality Assurance in Radiation Therapy Technology (2)** Staff  
Quality assurance procedures, including review of patient charts, monitoring of equipment, and evaluation of treatment facilities.
- 33 **Clinical Practicum (3 to 5)** Staff  
Participation in treatment planning and therapeutic applications at a local health care facility under supervision of an approved preceptor. Student gains experience in using a wide variety of technical procedures. Full-time program participation required for 15 weeks during the summer sessions. Admission by permission of instructor.
- 40-41-42 **Clinical Training and Experience in X-ray Technology I-II-III (2-2-2)** Staff  
Instruction and close supervision in the use of radiologic techniques to examine the digestive, urinary, female reproductive, central nervous, and circulatory systems. Chest and abdomen radiography, orthopaedic radiography, ENT and neurologic radiography, portable radiographic examinations, pediatric radiography, nuclear medicine, radiation therapy.
- 43 **Introduction to Nuclear Medicine Technology (3)** Staff  
Provides the background for clinical work in nuclear medicine technology. Principles of patient care, federal and local regulations concerning radiation safety, introduction to radiopharmacy, instrumentation, and basic procedures of nuclear medicine technology. Course requirements include CPR certification.
- 44-45-46 **Clinical Practicum I-II-III (3-3-3)** Staff  
Supervised experience in procedures and methods of nuclear medicine technology, with emphasis on indications and contraindications, safety techniques, preparation and development of radiopharmaceuticals, research methods, and administrative procedures.
- 50 **Radiographic Anatomy and Positioning II (4)** Staff  
Human anatomy and positioning as applied to radiologic technology. Structure and function of the human skeleton and topographical anatomy, both normal and pathological. Positioning techniques are practiced in the laboratory.
- 51 **Radiographic Anatomy and Positioning IV (4)** Staff  
Basic positioning techniques, including those applicable to the upper and lower extremities, are studied and practiced, using radiographic machines, phantoms, and film-processing methods.
- 55-56 **Clinical Nuclear Medicine I-II (3-3)** Staff  
Study of routine procedures done in a nuclear medicine department. Aspects of anatomy, physiology, and pathology that relate to organ imaging, organ concentration-excretion measurements, and hematologic and dilution procedures.
- 59 **Competitive Binding Radioassay (2)** Staff  
Basic concepts of radioassay and procedures for any competitive binding radioassay. Specific concepts and procedure for T<sub>3</sub>, T<sub>4</sub>, and serum B-12 determinations. Factors affecting those determinations and the interpretation of their results.
- 60 **Radiographic Technique (4)** Staff  
History and development of X-rays and X-ray tubes. Major factors affecting film quality. Quality assurance.
- 61 **Radiographic Anatomy and Positioning III (4)** Staff  
Techniques of radiography employing contrast media, fluoroscopy, spot films, body section radiography, pelvimetry, location of foreign body in the eye and operating techniques. Prerequisite: Rad 60.
- 62 **Darkroom Procedures (2)** Staff  
Processing of film after exposure, care and handling of darkroom equipment, types of film, handling and storage, mixing and handling of chemicals and the action of these chemicals in processing, effects of heat and cold on chemicals, diagnosis of improper developing techniques. Laboratory work.
- 66 **Radiopharmaceuticals (3)** Staff  
Uses of radionuclides in medicine, basic principles of a Mo-99/Tc-99m generator, radiopharmaceuticals and their action within the body, preparation of radio-



- pharmaceuticals using generator produced nuclides, quality control, accountability, procurement, clinical orientation.
- 70 **Radiographic Physics I (3)** Staff  
Basic concepts of physics, including standards of measure, metric measurement, laws of motion, weight, work, power, energy, and momentum. Introduction to structure of matter, atomic and nuclear structure, periodic tables, chemical bonding, material and artificial radioactivity, series decay. Electrostatics and magnetism. Laboratory work.
- 71 **Radiographic Physics II (4)** Staff  
Basic concepts of current flow, ohms, and Joule's law, series/parallel, compound circuits, battery types and functions, metering devices, electrical safety. Electromagnetism and induction, alternating current principles, AC cycle, induction and inductor, capacitance and capacitors. Applications of electronic principles to X-ray equipment and components. Laboratory work.
- 73 **Nuclear Instrumentation (3)** Staff  
Introduction to radiation detectors used in a nuclear medicine department, including dose calibrators, survey instruments, spectrometers, stationary cameras, and SPECT and PET instruments.
- 74 **Computer Applications in Nuclear Medicine Technology (3)** Staff  
Use of computers in imaging, radioimmunoassay, and the analysis of other clinical data in nuclear medicine. Lecture and laboratory.
- 80 **Mathematics of Radiology (3)** Staff  
Principles of mathematics as applied to the physics of radiologic technology: use of logarithms, powers, and roots, scientific notation, geometry, trigonometry, linear equations, Cartesian coordinate plane, and slope of straight line.
- 90 **Ethics in Radiologic Technology (1)** Staff  
Ethics of physician-technician-patient relationships. Responsibilities, both moral and legal, to physician and patient, the rapport expected of the technologist.
- 91 **Special Projects in Radiology (arr.)** Staff  
Independent study of an aspect of radiology determined by the student and the instructor. Students may register by petition only.
- 95 **Radiation Safety (2)** Staff  
Techniques and equipment design for reducing unnecessary radiographic exposure of the patient and technologist.
- 96 **Radiation Biology (3)** Staff  
Effects of ionizing radiation on cells, tissues, organs, and the human body. Organic and inorganic molecules; human immunity system. Radiosensitivity of the developing embryo; possible genetic effects of radiation. Chronic and acute effects of radiation. History and use of radiation in therapy. Prerequisite: Rad 50, 70, 71.
- 97 **Radiographic Anatomy and Positioning V (4)** Staff  
Special radiographic procedures, including cerebral, abdominal, and cardiac angiography. Lecture and laboratory. Prerequisite: Rad 61, 71.
- 99 **Alternate Imaging Systems (3)** Staff  
Various modalities of radiographic imaging systems and types of equipment. Intensification screens, fluoroscopy, spot filming, image intensification, cinefluoroscopy, film changes, thermography, electron radiography, and computerized axial tomography. Prerequisite: Rad 60, 71, 95.
- 100 **Pathology (3)** Staff  
Radiographic pathology relevant to the radiologic technologist. Clinical description of the disease process and radiographic demonstrations.
- 115 **Radiation Oncology Physics (3)** Staff  
Continuation of Rad 14. Specific principles of ionizing radiation. Discussion of treatment units and radiation safety.
- 130 **Mathematics of Radiology (1)** Lundsten  
Use of exponential and logarithm function, including powers and roots, scientific notation, geometry of the circle, square, and rectangle, basic trigonometric functions, linear equations, and the unknown; Cartesian coordinate plane, slope of a straight line, and linear equations from given conditions.
- 140 **Radiology Administration (4)** Pickwick  
Topics related to radiology management at the department level, including organizational behavior, planning and control. Discussion of the logistics of managing a radiology section. Prerequisite: HSMP 142, 153, 154, 170.

- 145 Administrative Project (3)** Pickwick  
For students concentrating in diagnostic radiology, nuclear medicine, or radiation therapy. A senior seminar in which students will identify, develop, and complete a paper of publishable quality on a topic related to radiology, medical science, health care, or management. Concurrent registration: Rad 140
- 160 Computer Applications in Radiology (3)** Staff  
Administrative and clinical applications of the digital computer in radiology, with emphasis on the design, procurement, and implementation of computer systems. Students participate in team projects involving operational management of clinical systems, write a paper, and prepare a class presentation based on project results.
- 167 Physics of Diagnostic Radiology (3)** Goodenough  
Mechanisms in the production of X-rays and X-ray circuits. Interaction of radiation with matter. Beam restrictors, grids, film, screens, fluoroscopic systems, computerized tomography, mammography, ultrasound, and magnetic resonance imaging. Prerequisite: Rad 130.
- 168 Occupational Radiation Safety (3)** Miller  
Principles of radiation protection applicable to medical X-ray and radioactive sources; methods of calculating and measuring radiation doses; safety procedures. Prerequisite: Rad 172.
- 172 Physics of Nuclear Medicine (3)** Adams  
Introduction to properties of nuclei and nuclear models, forces, and reactions. Study of radioactive decay, ionization processes in matter, radiation dosage, and radionuclides in biology and medicine.
- 180 Special Projects in Radiology (arr.)** Paullner  
For radiology students who wish to pursue independent research on a current topic in radiology, physics, or administration. A written report is required. May be taken for graduate credit.
- 195 Quality Control in X-Ray Imaging (3)** Butler  
Laboratory course. Experience in quality assurance testing of processor, film, darkroom systems, X-ray generators and tubes, phototimers, fluoroscopic systems and conventional and computerized tomography systems. Establishing, maintaining, and evaluating equipment testing programs. Prerequisite: Rad 167 or permission of instructor.
- 196 Fundamentals of Magnetic Resonance Imaging (3)** Butler  
Introduction to magnetic resonance imaging, including physical principles, imaging principles, equipment design, siting requirements, clinical safety, quality assurance, image interpretation, special techniques, financial considerations, and future technical developments. Prerequisite: one year of college-level physics.
- 197 Practicum in Magnetic Resonance Imaging (2)** Staff  
Students learn to operate a magnetic resonance imaging unit, screen and position patients, select appropriate pulse sequences, and evaluate image quality and artifacts. become familiar with specific characteristics of the clinical unit in use, and observe clinical interpretation. Prerequisite or concurrent registration: Rad 196.
- 198 Practical Approach to Diagnostic Ultrasound (3)** Staff  
Introduction to diagnostic ultrasound, with emphasis on basic applications. Ultrasound physics, scanning fundamentals, cross-sectional anatomy, and approach techniques for all aspects of ultrasound, excluding echocardiograms and equipment design/purchase considerations. Prerequisite: clinical experience as a technician, nurse, or physician.
- 201 Advanced Topics in Nuclear Magnetic Resonance (3)** Staff  
Topics include generation of nuclear magnetic resonance signals, Bloch equations, rotating frame analysis, relaxation mechanisms, quadrature phase detection, chemical shift, receiver coil design, image encoding, slice selection, shim coils, magnet design, data processing, quality assurance, and zonal and tesseral harmonics mapping. Prerequisite: permission of instructor.
- 383 Clinical Radiology (5)** Jacobs and Staff  
For the initial portion of the course, students work in a simulated reading room with a faculty member in a review of the American College of Radiology learning file of radiographs. Students then rotate through and observe various sections in the University Hospital department of radiology.
- 385 Nuclear Medicine (arr.)** Reba and Staff  
Introduction to the application of radiotracer techniques in clinical medicine and biomedical research. Participation as clinical nuclear medicine intern or as re-



search assistant. Student is encouraged to become involved with one of the research projects of the division or in an independent investigation oriented toward pharmaceutical chemistry, computer applications, or patient care. University Hospital.

- 386 **Radiation Oncology** (arr) Rogers, Nev  
Introduction to radiation oncology, including basic principles of radiation physics and biology as well as therapy techniques. Experience in management of patients with a variety of malignant diseases, with emphasis on diagnosis, staging, and treatment alternatives.
- 387 **Subspecialty Diagnostic Radiology** (arr) Jacobs and Staff  
Subspecialty training in radiological diagnosis to prepare students for specialty medical training. Offerings include bone, pulmonary, gastrointestinal, urologic, obstetric and gynecologic, and neurologic subspecialties. Prerequisite: permission of department. University Hospital.
- 388 **Magnetic Resonance Imaging and Computerized Tomography** (arr) Dina, Javitt  
Introduction to newer diagnostic modalities for understanding of their value and when they should be ordered in the work up of a patient.
- 390-92 **Extramural Radiology Elective** (arr)  
Elective periods at other institutions.
- 400 **Diagnostic Radiology** (arr) Grant and Staff  
General radiography, fluoroscopy and nuclear medicine special procedures, ultrasound and/or CT. Review and study of teaching image file. Washington Hospital Center.
- 402 **Introduction to Chest Radiology** (3) Jacobs  
Two-week radiology elective designed to improve the physician's understanding of radiographic principles and diagnostic approaches, with emphasis on chest films.
- 403 **Introduction to Bone Radiology** (3) Jacobs  
Two-week radiology elective designed to improve the physician's understanding of radiographic principles and diagnostic approaches, with emphasis on bone films.
- 404 **Emergency Radiology** (arr) Olmsted  
Introduction to plain X-ray film studies of patients coming through the emergency room. University Hospital.

## Surgery

Chair: R.G. DePalma

- 408 **Clinical Clerkship** (10) Hix  
Required for medical students. Eight weeks at University Hospital and National Naval Medical Center.
- 451 **Otolaryngology: Head and Neck Surgery** (arr) Burgess  
Participation in clinical service involving inpatients and outpatients. Walter Reed Army Medical Center.
- 452 **Otolaryngology** (arr) Thompson  
Inpatient and outpatient rotations, operating room experience. National Naval Medical Center.
- 454 **Otolaryngology: Head and Neck Surgery** (arr) Wilson, Kahn  
Work up and care of clinical and hospitalized patients. Participation in surgery and ER consultations. This course partially fulfills the surgical subspecialty requirement if the student did not have an ENT experience during the third year surgery clerkship.
- 457 **Advanced Surgery** (5) Tsangaris  
Participation in total patient care, including operative procedures, under close supervision.
- 458 **Intensive Care Unit** (5) Staff  
Introduction to the management of acutely ill surgical patients, including cases involving trauma, neurosurgery, and cardiovascular-thoracic, abdominal, and orthopaedic surgery. Washington Hospital Center.
- 459 **Transplantation Immunology** (arr) White  
Clinical renal transplantation and preservation. Daily teaching rounds, literature conference, seminar presentation, weekly surgical-medical nephrology rounds. University Hospital.

**383 Endocrine Surgery (arr.)**

Management of endocrine disorders. Emphasis on control of hyperfunction and neoplasms of the thyroid, parathyroid, adrenal, and pancreatic islet cell glands. Library and laboratory research and clinical exposure to surgical endocrinology. University and V.A. Hospitals. Geelhoed

**384 Thoracic Cardiovascular Surgery (5)**

Basic principles used in thoracic and cardiovascular surgery. Four-week elective periods. University Hospital and Medical Faculty Associates. Aaron

**385 Plastic and Reconstructive Surgery (arr.)**

Experience in the full spectrum of reconstructive surgery in both children and adults, including congenital anomalies, cosmetic surgery, neoplasms of the head and neck, facial trauma, benign and malignant skin lesions, hand surgery, burns, microsurgery, and breast surgery. Responsibilities in the operating room, at the bedside, and in the clinic. University and Children's Hospitals. McGrath

**389 Surgical Preceptorship (arr.)**

Care of general surgical patients as seen in private practice. Tsangaris

**390-95 Extramural Surgery Elective (arr.)**

Elective periods at other institutions. Tsangaris

**400 Special Programs (arr.)**

Special elective developed in consultation with department faculty. Sidaway and Staff

**401 Peripheral Vascular Surgery (arr.)**

Introduction to the physiologic basis for an approach to peripheral vascular disease. Initial assignment to the chief cardiovascular technician in the noninvasive laboratory. Modern diagnostic techniques, including observations of contrast arteriography. Student then follows a patient from admission, through surgery, and into the postoperative period. Opportunity to participate in private office practice. Washington Hospital Center. Jordan

**402 Burns (arr.)**

Participation in a nine-bed dedicated burn intensive care unit with an associated rehabilitation unit. Full-time attending. Giordano and Staff

**403 Peripheral Vascular Surgery (5)**

General introduction to peripheral vascular surgery. Time spent in vascular laboratory, in learning the basic arteriovenous and cerebrovascular examinations, and in evaluating vascular patients in an office practice. Assignment to one of the surgical services, participating in management and care of patients and attending to them in the operating room, if appropriate. Geelhoed

**404 Experimental Surgery (arr.)**

Projects in surgical research laboratories, employing animal models and experimental operative procedures in physiologic investigations. Emphasis on design of experiments, performance of experimental surgical techniques, precision in laboratory data gathering, and analysis of data. Areas of investigation include surgical endocrinology, transplantation, and cardiovascular physiology. Smith

**405 Hand Surgery Clinic Research (arr.)**

Participation in care of patients of all ages, working closely with hand surgeons from orthopaedic and plastic surgical services. Basic approaches to diagnosis and treatment of a wide variety of hand disorders, including nerve injuries, arthritic conditions, congenital anomalies, fractures, vascular problems, and reconstructive techniques for these problems. Exposure to microsurgery. Participation in clinics, conferences, ward rounds, and operating room. Walter Reed Army Medical Center. Smith

**406 Plastic Surgery Clinic/Research (arr.)**

Participation in care of patients and exposure to a wide variety of surgical problems in all age groups, ranging from congenital anomalies such as cleft lip/palate and syndactyly to complex reconstructive surgery for abdominothoracic wall defects, head and neck cancer, and extremity reconstruction. Cosmetic surgery involving face, eyelids, and other areas. Participation in combined orthopaedic/plastic surgery hand service. Experience in evaluation and treatment of conditions related to the upper extremity. Research opportunities. Student assists in microsurgical laboratory on a regular basis. Walter Reed Army Medical Center.



## Urology

Chair H.C. Miller, Jr

### 302 Clinical Clerkship (3)

Karmi

Observation of urologic conditions and procedures for diagnosis and treatment. Radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. University, V.A., Fairfax, and Children's Hospitals

### 381 Clinical Urology (5)

Karmi and Staff

Observation of urologic conditions and procedures for diagnosis and treatment. Radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference. University, V.A., Children's, and Fairfax Hospitals

### 390-92 Extramural Elective (arr)

Elective periods at other institutions

## Faculty and Staff of Instruction\*

### Emeriti

- Theodore Judson Abernethy, *Professor Emeritus of Clinical Medicine*  
B.S. 1925, Denison University; M.D. 1929, Johns Hopkins University
- John Pletcher Adams, *Professor Emeritus of Orthopaedic Surgery and of Pediatrics*  
B.S. 1943, University of Missouri; M.D. 1945, Washington University
- Theodore Crandall Alford, *Professor Emeritus of Surgery*  
A.B. 1944, Haverford College; M.D. 1947, Johns Hopkins University
- Frank Duane Allan, *Professor Emeritus of Anatomy*  
B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University
- Louis Katz Alpert, *Professor Emeritus of Medicine*  
B.S. 1928; M.D. 1932, Yale University
- Seymour Alpert, *Professor Emeritus of Anesthesiology*  
B.A. 1939, Columbia University; M.D. 1943, State University of New York Downstate Medical Center
- William Staton Anderson, *Professor Emeritus of Clinical Pediatrics*  
B.A. 1927, Duke University; M.D. 1931, Johns Hopkins University
- Robert Henry Barter, *Professor Emeritus of Obstetrics and Gynecology*  
B.S. 1937; M.D. 1940, University of Wisconsin
- Christian Virgil Cimmino, *Professor Emeritus of Clinical Radiology*  
A.B. 1937, Harvard University; M.D. 1941, Johns Hopkins University
- William Hurlbert Cooper, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
B.A. 1940, Case Western Reserve University; M.D. 1949, George Washington University
- Leon Richard Culbertson, *Professor Emeritus of Urology*  
B.S. M.D. 1936, University of Virginia
- Abraham Wolffe Danish, *Professor Emeritus of Clinical Medicine*  
A.B. 1938, M.D. 1941, George Washington University
- Henry Laurant Darnet, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
B.A. 1916, Western Maryland College; M.D. 1920, Johns Hopkins University
- Samuel Mayer Dokle, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
B.A. 1923, George Washington University; M.D. 1927, Thomas Jefferson University; MA 1931, Case Western Reserve University
- William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental)*  
B.A. 1927, Ph.D. 1933, Yale University
- James Albert Dusbabek, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
M.D. 1944, George Washington University
- Henry Dunlop Ecker, *Professor Emeritus of Clinical Medicine*  
B.S. 1936; M.D. 1940, University of Virginia
- Clayton Bernard Ethridge, *Professor Emeritus of Medicine*  
M.D. 1933, University of Virginia
- Henry Leon Feffer, *Professor Emeritus of Orthopaedic Surgery*  
B.A. 1939, Indiana University; M.D. 1942, Indiana University-Purdue University at Indianapolis
- James Joseph Feffer, *Professor Emeritus of Clinical Engineering and of Medicine*  
B.A. 1935, Indiana University; M.D. 1938, Indiana University at Indianapolis
- Morris Feitel, *Clinical Professor Emeritus of Pediatrics*  
M.D. 1957, George Washington University
- Marvin Peace Footer, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
B.A. 1936; M.D. 1942, George Washington University
- James Quincy Gant, Jr., *Professor Emeritus of Clinical Dermatology*  
B.A. 1930; M.S. 1931, Ohio State University; M.D. 1935, Medical College of Virginia of Virginia Commonwealth University

\*The faculty and staff of instruction listed here by department represent appointments current as of fall 1990. Faculty and staff members who hold appointments in two or more departments have the department of primary responsibility listed first.



**Frederick Chapman Green, Professor Emeritus of Pediatrics and of Health Care Sciences**

BS 1942, Indiana University at Bloomington; M.D. 1944, Indiana University-Purdue University at Indianapolis

**Robert Henry Groh, Professor Emeritus of Clinical Neurology**

BS 1935, M.D. 1937, University of Pittsburgh

**Isabella Harrison, Assistant Professor Emeritus of Clinical Surgery**

AB 1954, Nassau College; M.D. 1958, Johns Hopkins University

**Clarence Richard Hartman, Associate Professor Emeritus of Microbiology and Immunology**

BA 1933, M.D. 1936, George Washington University

**Murdock Head, Airlie Professor Emeritus of Medical and Public Affairs**

D.D.S. 1947, University of Louisville; M.D. 1953, University of Vermont; D.D. 1958, George Washington University

**Roy Hertz, Research Professor Emeritus of Pharmacology**

BA 1930, Ph.D. 1934, M.D. 1939, University of Wisconsin; M.P.H. 1940, Johns Hopkins University

**William Allen Howard, Professor Emeritus of Clinical Pediatrics**

M.D. 1934, Tulane University

**Vincent Michael Iovine, Professor Emeritus of Clinical Surgery**

BS 1931, Manhattan College; M.D. 1935, Columbia University

**Thomas Nick Johnson, Professor Emeritus of Anatomy**

BS 1949, St. Ambrose College; M.S. 1949, Michigan State University; Ph.D. 1953, University of Michigan

**Paula Reines Kaiser, Associate Professor Emeritus of Anesthesiology**

M.B. (Ch.B.) 1940, University of St. Andrews, Scotland; M.D. 1947, State University of New York

**Marie-Louise Levy Kennedy, Associate Professor Emeritus of Anesthesiology**

BS 1943, Collège de Ville Franche, De Rouergue, France; M.D. 1952, Strasbourg Medical School, France

**Richard Alec Kenney, Henry D. Fry Professor Emeritus of Physiology**

BS 1945, Ph.D. 1947, University of Birmingham, England

**Harold Kirby Smith, Professor Emeritus of Clinical Dermatology**

BS 1927, University of the South; M.D. 1937, George Washington University

**Calvin Trexler Klopp, Professor Emeritus of Surgery**

B.A. 1944, Swarthmore College; M.D. 1958, Harvard University

**Norman Clifford Kramer, Professor Emeritus of Medicine**

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- Herbert Pollack, *Professor Emeritus of Clinical Medicine (Biochemistry)*  
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- Neel Jack Price, *Professor Emeritus of Clinical Obstetrics and Gynecology*  
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 BA. 1941. M.D. 1945. Georgetown University
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- Ruth E. Bulgur, *Professorial Lecturer in Anatomy*  
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- Mary Frances Ericksen, *Associate Professorial Lecturer in Anatomy*  
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- Barbara Gilson Hoffman, *Visiting Associate Professor of Anatomy*  
 BA. 1968, Temple University; Ph.D. 1975, Thomas Jefferson University
- Kurt Edward Johnson, *Professor of Anatomy*  
 BS. 1965, Johns Hopkins University; M.Phil. 1969, Ph.D. 1970, Yale University
- Douglas E. Kelly, *Professorial Lecturer in Anatomy*  
 BS. 1954, Colorado State University; Ph.D. 1958, Stanford University
- Marilyn Jean Koering, *Professor of Anatomy*  
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- Tomislav Letic, *Assistant Visiting Professor of Anatomy*  
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 BS. 1980, Virginia Commonwealth University; Ph.D. 1987, Uniformed Services University of the Health Sciences
- Kenna Dale Pensner, *Professor of Anatomy*  
 BS. 1968, Simmons College; Ph.D. 1974, Harvard University
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 BA. 1973, Kent State University; Ph.D. 1976, Pennsylvania State University
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- Douglas Henry Uebelaker, *Professorial Lecturer in Anatomy*  
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- Matthew Joseph Becker, *Assistant Professor of Anesthesiology and of Pediatrics*  
 BS. 1977, Massachusetts Institute of Technology; M.D. 1979, Tufts University
- Michael Joseph Berrigan, *Assistant Professor of Anesthesiology*  
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- Basil Elias Economopoulos, *Associate Clinical Professor of Anesthesiology*  
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- Manfred Wilhelm Lichtmann, *Professor of Anesthesiology*  
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- Willis Alexander McGill II, *Professor of Anesthesiology and of Pediatrics*  
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- Gerrud Weber Mergner, *Associate Professor of Anesthesiology*  
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- Peter Harvey Fishman, *Professorial Lecturer in Biochemistry and Molecular Biology*  
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## Computer Medicine

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## Dermatology

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- Martin Braun III, *Associate Clinical Professor of Dermatology and of Medicine*  
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B.A. 1946, Kew-Forest College; M.D. 1948, University of Michigan
- Marvin Chadab, *Assistant Clinical Professor of Dermatology*  
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- Leonard Dean Cutler, *Assistant Clinical Professor of Dermatology*  
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- Robert Neal De Angelis, *Assistant Clinical Professor of Dermatology*  
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- Edward Charles De Fabo, *Associate Research Professor of Dermatology*  
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- Mervyn L. Elgart, *Professor of Dermatology, of Pediatrics, and of Medicine*  
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B.S. 1957, Rutgers University; M.D. 1962, George Washington University

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B.S. 1974, Boston College; M.D. 1981, Catholic University of America

Isaac Weiszer, *Associate Clinical Professor of Medicine*

B.S. 1956, M.D. 1960, University of Illinois

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B.A. 1974, Swarthmore College; M.D. 1978, State University of New York at Stony Brook

Gloria Ruth Werth, *Associate Clinical Professor of Medicine and of Health Care Sciences*

A.B. 1949, Goucher College; M.D. 1953, Johns Hopkins University

Patience Haydock White, *Associate Professor of Medicine (Rheumatology) and of Pediatrics*

A.B. 1970, Assar College; M.S. 1972, Dartmouth College; M.D. 1973, Harvard University

Robert Shaw Wilkinson, *Associate Clinical Professor of Medicine*

B.A. 1950, Dartmouth College; M.D. 1955, New York University



- Ann Lottie Barnett Williams, *Assistant Clinical Professor of Medicine*  
MB, BS 1905, University of London, England
- John William Winkler, *Assistant Clinical Professor of Medicine*  
BS 1949, M.D. 1953, Georgetown University
- Karl Wipplinger, *Associate Professor of Medicine*  
MD 1953, University of Vienna, Austria
- Leonard Arthur Wisneski, *Clinical Professor of Medicine*  
BS 1969, Drexel University; M.D. 1973, Thomas Jefferson University
- Philip Witorsch, *Clinical Professor of Medicine and Adjunct Professor of Physiology*  
AB 1958, M.D. 1962, New York University
- Martin Samuel Wolfe, *Clinical Professor of Medicine*  
BA 1947, M.D. 1961, Cornell University; D.C.M.T. 1967, London School of Hygiene and Tropical Medicine, England
- Frederick William Wolff, *Professor of Medicine*  
MB, BS 1946, M.D. 1957, Durham University, England
- Daniel I. Woronow, *Assistant Clinical Professor of Medicine*  
BA 1975, M.D. 1978, Johns Hopkins University
- Edward Stanley Yanowitz, *Assistant Professor of Medicine*  
BA 1972, Yale University; M.D. 1978, University of Guadalajara, Mexico
- Eral Yoo, *Associate Clinical Professor of Medicine*  
MD 1967, Seoul National University, Korea
- Jack Evans Zimmerman, *Professor of Anesthesiology and of Medicine*  
BS 1960, University of Maryland; M.D. 1964, George Washington University
- Lawrence Anthony Zimnoch, *Clinical Instructor in Medicine*  
BS 1979, Loma College of Medicine; M.D. 1984, University of Maryland
- Jonathan Zinberg, *Assistant Clinical Professor of Medicine*  
BS 1971, City University of New York, Brooklyn College; M.D. 1980, Columbia University
- Bruce Walter Zinsmeister, *Assistant Clinical Professor of Medicine*  
BS 1971, Tufts University; M.D. 1978, State University of New York Downstate Medical Center
- Jonathan Zuckerman, *Instructor in Medicine*  
BS 1984, M.D. 1987, Brown University

## Microbiology and Immunology

- Lewis Francis Affronti, *Professor of Microbiology and Immunology*  
AB 1960, AM 1961, State University of New York at Buffalo; Ph.D. 1968, Duke University
- Joseph F. Albright, *Adjunct Professor of Microbiology and Immunology*  
BS 1960, Southwestern University; Ph.D. 1968, Indiana University
- Jana W. Albright, *Professor of Microbiology and Immunology*  
BS 1962, East Tennessee State University; MS 1972, University of Akron; Ph.D. 1976, Indiana State University
- Joseph Michael Campos, *Associate Professor of Pediatrics, of Pathology and of Microbiology and Immunology*  
AB 1968, MA 1970, Ph.D. 1973, University of California
- John Henry Grossman III, *Professor of Obstetrics and Gynecology and of Microbiology and Immunology*  
AB 1967, M.D. 1971, University of Rochester; Ph.D. 1982, George Washington University
- Kun-Yen Huang, *Adjunct Professor of Microbiology and Immunology*  
AB 1968, National Taiwan University; Ph.D. 1967, George Washington University
- Phyllis Dawn Kind, *Professor of Microbiology and Immunology of Medicine and of Genetics*  
BA 1965, Michigan State University; MS 1966, Ph.D. 1969, University of Michigan
- David T. Kingsbury, *Professor of Microbiology and Immunology*  
BS 1962, MS 1965, University of Washington; Ph.D. 1971, University of California, San Diego
- James Don MacLowry, *Adjunct Professor of Microbiology and Immunology*  
BA 1960, Yale University; M.D. 1966, Columbia University
- N. Michael Matuszewicz, *Assistant Professor of Microbiology and Immunology*  
BS 1973, California State Polytechnic University; MA 1983, Ph.D. 1984, University of California
- Ruth Neta, *Adjunct Associate Professor of Microbiology and Immunology*  
MS 1966, University of Tel Aviv, Israel; Ph.D. 1978, University of North Hamre

- Kathie Lynn Olsen, *Adjunct Associate Professor of Microbiology and Immunology*  
B.S. 1974, Chatham College; Ph.D. 1979, University of California
- Melvin Reich, *Professor of Microbiology and Immunology*  
B.S. 1953, City University of New York, City College; M.S. 1957; Ph.D. 1960, Rutgers University
- William Julio Rodriguez, *Professor of Pediatrics and of Microbiology and Immunology*  
B.S. 1963, M.D. 1967, Ph.D. 1975, Georgetown University
- John Louis Sever, *Professor of Pediatrics, of Obstetrics and Gynecology, and of Microbiology and Immunology*  
M.D., Ph.D. 1957, Northwestern University
- Gerald Virgil Stokes, *Associate Professor of Microbiology and Immunology*  
B.A. 1967, Southern Illinois University; Ph.D. 1973, University of Chicago
- Virginia M. Turner, *Adjunct Assistant Professor of Parasitology in Microbiology and Immunology*  
B.S. 1960, Towson State University

### Neurological Surgery

- Melvin Gustavus Alper, *Clinical Professor of Ophthalmology and of Neurological Surgery*  
B.A. 1943, M.D. 1945, University of Virginia
- Bruce Jorge Ammerman, *Clinical Professor of Neurological Surgery*  
B.A. 1969, Case Western Reserve University; M.D. 1972, George Washington University
- Harvey Hirsch Ammerman, *Clinical Professor of Neurological Surgery*  
B.S. 1949, M.D. 1943, George Washington University
- Vernon W. Armbrustmacher, *Professorial Lecturer in Neurological Surgery*  
M.D. 1984, University of Michigan
- Charles Jules Azzam, *Assistant Clinical Professor of Neurological Surgery*  
M.D. 1979, Saint Joseph University, Lebanon
- John William Barrett, *Assistant Clinical Professor of Neurological Surgery*  
M.D. 1958, George Washington University
- Jerald Jack Bernstein, *Research Professor of Neurological Surgery and of Physiology*  
B.A. 1955, City University of New York, Hunter College; M.S. 1957; Ph.D. 1959, University of Michigan
- Edward Bernard Byrd, *Assistant Clinical Professor of Neurological Surgery*  
B.A. 1963, M.D. 1965, George Washington University
- F. Donald Cooney, *Clinical Professor of Neurological Surgery*  
B.S. 1950, King's College (Pennsylvania); M.D. 1963, University of Pittsburgh
- David Oliver Davis, *Professor of Radiology of Neurology, and of Neurological Surgery*  
B.S. 1954, University of Illinois; M.D. 1958, St. Louis University
- Michael William Dennis, *Clinical Professor of Neurological Surgery*  
B.A. 1965, Brown University; M.D. 1969, Yale University
- Giovanni Di Chiro, *Clinical Professor of Neurological Surgery*  
M.D. 1949, University of Naples, Italy
- Barton Lucius Guthrie, *Assistant Professor of Neurological Surgery*  
B.S. 1976, M.D. 1980, University of Alabama in Birmingham
- Robert David Harris, *Associate Clinical Professor of Neurological Surgery*  
B.S. 1960, Louisiana State University; M.D. 1970, Medical College of Virginia or Virginia Commonwealth University; Ph.D. 1982, University of Minnesota
- Donald Gerard Hope, *Clinical Instructor in Neurological Surgery*  
B.S. 1978, Villanova University; M.D. 1982, University of Maryland
- Norman Harold Horwitz, *Professor of Neurological Surgery*  
A.B. 1945, Princeton University; M.D. 1948, Columbia University
- Arthur Proctor Hustead, *Clinical Professor of Neurological Surgery*  
B.S. 1949, M.D. 1954, Yale University
- Jeff Jacobson, *Assistant Clinical Professor of Neurological Surgery*  
B.A. 1973, University of Rochester; M.D. 1977, George Washington University
- Saied Jamshidi, *Assistant Clinical Professor of Neurological Surgery*  
M.D. 1974, University of Tehran, Iran



- Dennis Lee Johnson, *Associate Professor of Neurological Surgery and of Pediatrics*  
 BA 1967, M.D. 1971, University of California, Davis
- Najmaldin Omer Karim, *Assistant Clinical Professor of Neurological Surgery*  
 MB, ChB 1973, Mosul University, Iraq
- Arthur Irwin Koblinc, *Clinical Professor of Neurological Surgery*  
 BA 1964, M.D. 1968, Northwestern University, Ph.D. 1979, George Washington University
- Walter Edward Lawtonson, *Associate Clinical Professor of Neurological Surgery*  
 BS 1960, M.D. 1969, Case Western Reserve University
- Edward R. Laws, Jr., *Professor of Neurological Surgery*  
 AB 1950, Princeton University, M.D. 1953, Johns Hopkins University
- David C. McCullough, *Professor of Neurological Surgery and of Pediatrics*  
 AB 1957, University of Michigan, M.D. 1961, Ohio State University
- George Albert Morales, *Professor of Anesthesiology and of Neurological Surgery*  
 BS 1947, M.D. 1951, University of Mexico
- Aub Khan Ommaya, *Clinical Professor of Neurological Surgery*  
 M.D. 1954, King Edward Medical College, India, M.A. 1960, Oxford University
- Thomas Glenn Pait, *Clinical Instructor in Neurological Surgery*  
 BS 1973, University of Florida, M.D. 1984, George Washington University
- Morris Wade Pulliam, *Associate Clinical Professor of Neurological Surgery*  
 M.D. 1966, Washington University
- Jeffrey Mark Rosenstein, *Professor of Anatomy and of Neurological Surgery*  
 BA 1971, Kent State University, Ph.D. 1976, Pennsylvania State University
- Frederick Tovi Schwartz, *Associate Clinical Professor of Neurological Surgery*  
 BA 1965, American International College, M.D. 1969, George Washington University
- Bernard Stopak, *Associate Clinical Professor of Neurological Surgery*  
 BS 1959, University of Maryland, M.D. 1970, University of Maryland, France
- Charles Stanley Tidball, *Professor of Computer Medicine and of Neurological Surgery*  
 AB 1950, Wesleyan University, MS 1952, University of Rochester, Ph.D. 1955, University of Wisconsin, M.D. 1956, University of Chicago
- Roger Ivo Von Hanwehr, *Assistant Clinical Professor of Neurological Surgery*  
 BA 1974, M.D. 1979, University of Southern California

## Neurology

- Kristof Abraham, *Associate Clinical Professor of Neurology*  
 M.D. 1954, University of Budapest, Hungary
- Frank Hughes Anderson, *Assistant Clinical Professor of Neurology*  
 BA 1960, M.D. 1970, Harvard University
- Marta Ewa Archutowska Kempka, *Adjunct Assistant Professor of Neurology*  
 M.D. 1970, Higher School of Medicine, Poland
- Brian Howard Avin, *Assistant Clinical Professor of Neurology*  
 BS 1968, Marquette College, M.D. 1972, Chicago Medical School
- Ann Birnbaum Barnett, *Professor of Neurology and of Pediatrics*  
 AB 1961, Saint Lawrence College, M.D. 1966, Harvard University
- Michael E. Batupps, *Assistant Clinical Professor of Neurology*  
 BS 1968, M.D. 1972, Howard University
- Peter G. Bernad, *Assistant Clinical Professor of Neurology*  
 BA 1960, M.D. 1974, McGill University, Canada
- V. Jose Blazina, *Adjunct Professor of Neurology*  
 BA 1965, University of Washington, M.D. 1967, George Washington University
- Allen Richard Braun, *Adjunct Assistant Professor of Neurology*  
 AB 1968, Washington University, M.D. 1980, Rush Medical College, MS 1979, University of Wisconsin
- Frederic C. Crockett Calvert, *Assistant Clinical Professor of Neurology*  
 BS 1970, M.D. 1976, Brown University
- Luci Ann Civitello, *Assistant Professor of Neurology and of Pediatrics*  
 BS 1970, Brown College, M.D. 1980, New York Medical College
- John Adrienne Conry, *Assistant Professor of Neurology and of Pediatrics*  
 BS 1974, Washington University, M.D. 1977, Texas Tech University, Health Sciences Center

David Oliver Davis, *Professor of Radiology, of Neurology, and of Neurological Surgery*

B.S. 1954, University of Illinois; M.D. 1958, St. Louis University

Miryam Maltinskis Davis, *Assistant Clinical Professor of Neurology and of Pediatrics*

M.D. 1957, University of Buenos Aires, Argentina

Kenneth William Eckmann, *Assistant Clinical Professor of Neurology*

B.A. 1974, University of California, Berkeley; M.S. 1977, Massachusetts Institute of Technology; M.D. 1981, Harvard University

Richard Nathan Edelson, *Clinical Professor of Neurology*

B.A. 1963, Dartmouth College; M.D. 1966, Harvard University

Helene Audrey Emsellem, *Associate Professor of Neurology and of Emergency Medicine*

M.D. 1977, George Washington University

Donald Jay Fishman, *Associate Clinical Professor of Neurology and of Pediatrics*

B.S. 1956; M.D. 1959, University of Illinois

Richard P. Roa, *Assistant Clinical Professor of Neurology*

B.A. 1968, Harvard University; M.D. 1972, University of Michigan; M.A. 1988, Georgetown University

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Grace Priscilla Gabe, *Assistant Clinical Professor of Neurology and of Psychiatry and Behavioral Sciences*

B.A. 1955, Radcliffe College; M.D. 1959, Boston University

Neville A. Gibbs, *Assistant Clinical Professor of Neurology*

M.B., B.S. 1975, University of the West Indies

Daniel Richard Glor, *Clinical Instructor in Neurology*

B.A. 1978, Harvard University; M.D. 1982, Johns Hopkins University

James Franklin Grim, *Assistant Clinical Professor of Neurology*

B.S. 1964, College of William and Mary; M.S. 1968, George Washington University; M.D. 1971, Emory University

Carl Harmon Gunderson, *Adjunct Professor of Neurology*

B.S. 1951, University of Notre Dame; M.S. 1958; M.D. 1958, University of Chicago

Donald Harry Harter, *Clinical Professor of Neurology*

A.B. 1953, University of Pennsylvania; M.D. 1957, Columbia University

Thomas Michael Hyde, *Clinical Instructor in Neurology*

B.A. 1978, M.D. 1984, Ph.D. 1984, University of Pennsylvania

Laura Marie Isensee, *Clinical Instructor of Neurology*

B.A. 1976, Brown University; M.D. 1982, Baylor College

Bahman Jabbari, *Adjunct Associate Professor of Neurology*

M.D. 1966, Tehran University, Iran

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B.S. 1976, Indiana University; M.D. 1983, University Autonoma Tamaulipas, Mexico

Patrick Alan Kelley, *Assistant Clinical Professor of Neurology*

B.A. 1969, Knox College; M.D. 1973, Loyola University of Chicago

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B.S. 1966; M.D. 1973; Ph.D. 1974, University of Chicago

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D.D.S. 1945; B.S. 1947; M.B. 1949; M.D. 1950, University of Minnesota

Ruediger Kratz, *Assistant Clinical Professor of Neurology*

M.D. 1973, University of Chicago

Neal Mark Kurzrok, *Clinical Instructor in Neurology*

B.S. 1978, Bucknell University; M.D. 1982, Medical College of Pennsylvania

Robert Laureno, *Associate Professor of Neurology*

B.A. 1967; M.D. 1971, Cornell University

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B.S. 1962; Ph.D. 1969, University of Chicago

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B.A. 1969, University of Wisconsin; M.D. 1973, New York University



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AB 1965, Grinnell College; MD 1967, Howard University
- Gary W. London, *Adjunct Assistant Professor of Neurology*  
BSM 1965, MD 1968, Northwestern University
- John Harold Lossing, *Assistant Clinical Professor of Neurology and of Medicine*  
BS 1966, MD 1970, University of Michigan
- Norman Alan Luban, *Assistant Clinical Professor of Neurology*  
BA 1967, State University of New York at Buffalo; MD 1971, Yeshiva University
- Carol Lynn Ludwig, *Assistant Research Professor of Neurology*  
AB 1969, Bryn Mawr College; MD 1974, Columbia University
- Donald Herbert Lussky, *Assistant Clinical Professor of Neurology*  
BA 1978, Southern Methodist University; MD 1982, University of Illinois
- Ramit Bharat Muni, *Assistant Professor of Neurology*  
MB, BS 1975, MD 1978, University of Madras, India
- Dale Elroy McFarlin, *Adjunct Professor of Neurology*  
BA 1967, MD 1969, Vanderbilt University
- Giuseppe Francis Molinari, *Professor of Neurology*  
BS 1957, College of the Holy Cross; MD 1961, New Jersey College of Medicine and Dentistry
- David Gauthier Moore, *Assistant Clinical Professor of Neurology*  
BA 1975, MD 1981, Indiana University
- Judith F. Morales, *Assistant Clinical Professor of Neurology*  
MD 1969, National University of Cordoba, Argentina
- Neth Alexander Morgan, *Assistant Clinical Professor of Neurology*  
BA 1970, Georgetown College; MD 1981, George Washington University
- Ninos C. Myrianthopoulos, *Associate Clinical Professor of Neurology*  
BS 1952, George Washington University; MS 1954, PhD 1957, University of Minnesota
- Karin Becker Nelson, *Associate Clinical Professor of Neurology and of Pediatrics*  
MD 1957, University of Chicago
- Steven K. Ng, *Assistant Clinical Professor of Neurology*  
AB 1961, Stanford University; MD 1968, Columbia University
- Nick Olmos-Liu, *Assistant Clinical Professor of Neurology*  
MD 1969, National University of Mexico
- Morris A. Osborn, *Assistant Clinical Professor of Neurology*  
MD 1964, University of Miami
- Roger J. Packer, *Professor of Neurology and of Pediatrics*  
BS 1972, MD 1976, Northwestern University
- Chang-Hun Park, *Adjunct Professor of Neurology*  
BS 1964, India Institute of Technology, Kharagpur; PhD 1972, University of California, Santa Cruz
- Michael Robert Pranzatelli, *Associate Professor of Neurology, of Pediatrics, and of Pharmacology*  
BS 1972, Lehigh University; MD 1976, Pennsylvania State University
- Philip David Pulaski, *Associate Clinical Professor of Neurology*  
AB 1974, MD 1977, Johns Hopkins University
- Bob Andrew Rappaport, *Instructor in Neurology*  
BA 1974, Arizona College; MD 1988, George Washington University
- Kenneth C. Riekler, *Assistant Clinical Professor of Neurology and of Psychiatry and Behavioral Sciences*  
BA 1968, Cornell University; MD 1972, State University of New York at Buffalo
- Guillermo R. Rodriguez, *Clinical Instructor in Neurology*  
BA 1974, University of Pennsylvania; MD 1976, University of Texas at Houston
- Martin Steven Rusinowitz, *Assistant Clinical Professor of Neurology*  
BA 1974, Temple University; MD 1980, Wayne State University
- David Sainsky, *Assistant Clinical Professor of Neurology*  
BA 1964, MD 1969, University of Pennsylvania
- Nathaniel Ansley Shelburne, Jr., *Clinical Professor of Neurology*  
AB 1960, Princeton University; MD 1966, University of Texas, Dallas
- Edward M. Silby, *Assistant Clinical Professor of Neurology*  
BA 1967, Dartmouth College; MD 1962, State University of New York at Buffalo
- Alexandre Monica Smith, *Clinical Instructor in Neurology and in Pediatrics*  
BA 1964, New York University; MD 1976, Medical College of Pennsylvania

Elliot Charles Wilner, *Assistant Clinical Professor of Neurology*

BA 1958, Columbia University; MD 1962, George Washington University

John Richard Wittenborn, Jr., *Assistant Clinical Professor of Neurology*

AB 1969, Rutgers University; MD 1973, Washington University

## Obstetrics and Gynecology

Alf K. Adler, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1970, Washington University; MD 1980, George Washington University

Flavius Abiola Akerele, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1968, Boston University; MD 1970, George Washington University

Julio Estuardo Alarcon, *Assistant Clinical Professor of Obstetrics and Gynecology*

MD 1966, University of Brazil, Peru

Israel Alter, *Assistant Clinical Professor of Obstetrics and Gynecology*

BS 1975, George Washington University; MD 1980, Georgetown University

Mavis Fay Anderson, *Assistant Clinical Professor of Obstetrics and Gynecology*

FRCS 1952, Royal College of Surgeons, Edinburgh

Robert Emil Badwey, *Assistant Clinical Professor of Obstetrics and Gynecology*

BS 1958, Franklin and Marshall College; MD 1959, University of Pittsburgh

Bernard Alvin Band, *Associate Clinical Professor of Obstetrics and Gynecology*

BA 1952, BS 1954, George Washington University; MD 1959, Howard University

Vinessa Marie Barnabei, *Assistant Professor of Obstetrics and Gynecology*

BS 1976, Rutgers University; PhD 1981, MD 1985, University of Virginia

Susanne Lee Bathgate, *Instructor in Obstetrics and Gynecology*

BS 1981, University of California, Irvine; MD 1986, George Washington University

Harry Carl Beaver, *Associate Clinical Professor of Obstetrics and Gynecology*

BS 1959, Wheaton College; MD 1963, George Washington University

Arthur Abbe Becker, *Clinical Professor of Obstetrics and Gynecology*

BS 1956, City University of New York, City College; MD 1961, University of Iowa

Richard Jay Beckerman, *Clinical Instructor in Obstetrics and Gynecology*

BS 1981, University of Wisconsin; MS 1982, MD 1986, Georgetown University

Samuel Michael Belinsky, *Clinical Professor of Obstetrics and Gynecology*

BA 1955, University of Bridgeport; MD 1959, George Washington University

John David Berryman, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1962, Swarthmore College; MS 1969, Case Western Reserve University; MD 1967, University of Virginia

Alan Bruce Birnkrant, *Assistant Clinical Professor of Obstetrics and Gynecology*

AB 1978, Washington University; MD 1983, Temple University

Kenneth Alan Blank, *Assistant Clinical Professor of Obstetrics and Gynecology*

BS 1978, Georgetown University; MD 1982, University of Maryland

Charles Russell Bore, *Associate Clinical Professor of Obstetrics and Gynecology*

MD 1974, Iowa State University

Bruce Gary Bonn, *Assistant Clinical Professor of Obstetrics and Gynecology*

BS 1978, Rensselaer Polytechnic Institute; MD 1980, Albany Medical College

Peter Alexander Bryce, *Clinical Instructor in Obstetrics and Gynecology*

MD 1974, Howard University

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BS 1953, Drake University; MD 1960, George Washington University

Sandra Caskie, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1976, Barnard College; MD 1982, George Washington University

Robert Lewis Castle, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1969, College of Wooster; MD 1976, George Washington University

Frank Edgar Chang, *Associate Clinical Professor of Obstetrics and Gynecology*

BS 1970, Stanford University; MD 1979, Baylor College of Medicine

Dianne Cresswell Cinnamon, *Assistant Clinical Professor of Obstetrics and Gynecology*

BS 1968, Muskingum College; MD 1973, George Washington University

James McClay Close, *Clinical Professor of Obstetrics and Gynecology*

AB 1951, Virginia Military Institute; MD 1955, University of Maryland

Martha Toma Cole, *Assistant Clinical Professor of Obstetrics and Gynecology*

BA 1967, Vassar College; MD 1977, George Washington University



- William Francis Colliton, *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1948, Georgetown University
- Thomas Alfred Cook, Jr., *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1949, University of Virginia
- Stewart Dallas Cooley, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS. 1957, Ohio State University; M.D. 1961, University of Cincinnati
- Wayne Douglas Cooper, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA. 1969, Alfred University; M.D. 1973, George Washington University
- William Hurlbert Cooper, Jr., *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA. 1976, University of Virginia; M.D. 1980, Medical College of Virginia of Virginia Commonwealth University
- Edward Earl Cunningham, *Assistant Clinical Professor of Obstetrics and Gynecology*  
AB. 1952, Washington and Jefferson College; M.S. 1954, Duquesne University; M.D. 1960, George Washington University
- Mary Elizabeth Cutting, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA. 1976, College of the Holy Cross; M.D. 1980, University of Virginia
- Margaret Rantz Davis, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA. 1973, Bryn Mawr College; M.D. 1977, University of Virginia
- Sebastian James Dispenza, Jr., *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1974, University of Virginia
- Stephen Michael Dixon, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS. 1970, Belmont College; M.D. 1983, George Washington University
- Oscar Irving Dudek, Jr., *Clinical Professor of Obstetrics and Gynecology*  
AB. 1959, University of Michigan; M.D. 1958, George Washington University
- Marvin Walter Dukes, Jr., *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS. 1968, Wilberforce University; M.B.A. 1973, Michigan State University; M.D. 1977, University of Nebraska
- Maureen Crittenden Edwards, *Associate Professor of Pediatrics and of Obstetrics and Gynecology*  
BS. 1966, Marquette University; M.D. 1970, George Washington University
- Thomas Edward Ein, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS. 1972, M.D. 1978, George Washington University
- Aiman El Nabawi El Mohandes, *Assistant Professor of Pediatrics and of Obstetrics and Gynecology*  
M.B. (B.B. 1974) M.S. 1978, M.D. 1981, Cairo University, Egypt
- Richard Vernon Erkenbeck, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS. 1962, University of Maryland; M.D. 1956, George Washington University
- Louis Earl Fetting, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS. 1965, Pennsylvania State University; M.D. 1967, Hahnemann Medical College
- Nicolae Filipescu, *Professor of Chemistry and Special Lecturer in Obstetrics and Gynecology*  
B.Sc. 1967, University of Industrial Chemistry, Bucharest; Institute, Romania; Ph.D. 1964, M.D. 1975, George Washington University
- Marj Ann Fletcher, *Associate Professor of Pediatrics and of Obstetrics and Gynecology*  
BS. 1965, University of Puget Sound; M.D. 1969, Washington University
- Julius Fogel, *Assistant Clinical Professor of Obstetrics and Gynecology*  
M.D. 1957, University of Virginia
- Richard Neil Footer, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS. 1970, University of Miami; M.D. 1981, George Washington University
- Andrew A. Freier, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1967, University of London; M.R.C.O.G. 1967, Royal College of Obstetricians and Gynecologists
- Arnold Jay Friedman, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS. 1960, City University of New York, Queens College; M.D. 1974, New York University
- Edward Elias Gahres, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS. 1956, Rutgers University; M.S. 1951, George Washington University; M.D. 1958, University of Virginia

- Charles Richard Alsop Gilbert, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1944, University of Virginia
- Robert James Gillanders, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1960, College of the Holy Cross; M.D. 1964, Georgetown University
- Paul Richard Gindoff, *Assistant Professor of Obstetrics and Gynecology*  
B.A. 1977, M.D. 1981, New York University
- Fern Lorraine Grapin, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.A. 1979, Clark University; M.D. 1983, George Washington University
- Jay Barry Greenberg, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.A. 1971, M.D. 1978, George Washington University
- Charles Stanley Greenhouse, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1959, Alfred University; M.D. 1963, Howard University
- Thomas Hamlin Gresinger, *Assistant Clinical Professor of Obstetrics and Gynecology*  
A.B. 1957, Williams College; M.D. 1961, George Washington University
- Jay M. Grodin, *Clinical Professor of Obstetrics and Gynecology*  
B.A. 1961, Hobart and William Smith Colleges; M.D. 1965, Thomas Jefferson University
- John Henry Grossman III, *Professor of Obstetrics and Gynecology and of Microbiology and Immunology*  
A.B. 1967, M.D. 1971, University of Rochester; Ph.D. 1982, George Washington University
- Liam Haim, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1951, M.D. 1955, Duke University
- Jerry Leborn Hall, *Assistant Professor of Obstetrics and Gynecology (Reproductive Endocrinology)*  
B.S. 1968, University of North Alabama; M.S. 1971, Ph.D. 1974, University of Mississippi
- Achim Jurgen Heintze, *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1967, University of Hamburg
- B. Frederick Helmkamp, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1967, Brown University; M.D. 1971, Cornell University
- Elisabeth Kremenak Herz, *Associate Clinical Professor of Obstetrics and Gynecology and of Psychiatry and Behavioral Sciences*  
M.D. 1981, University of Vienna, Austria
- Nicolette Sigrid Horbach, *Assistant Professor of Obstetrics and Gynecology*  
B.S. 1978, Wellesley College; M.D. 1982, Washington University
- Stephen Joel Horwitz, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.A. 1974, M.D. 1976, George Washington University
- Violet Bowen Hugh, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1958, M.D. 1961, George Washington University
- Sherilynn Joan Hummel, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1973, University of Minnesota; M.D. 1977, University of Illinois
- Sara Louise Imershein, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.A. 1976, University of Pennsylvania; M.D. 1980, Emory University
- Ronald David Jacobs, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1978, M.D. 1982, University of Maryland
- Susan Weitz Jaffe, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1974, Cornell University; M.D. 1977, George Washington University
- Richard Neil Jenet, *Clinical Instructor in Obstetrics and Gynecology*  
B.S. 1980, Muhlenberg College; M.D. 1984, University of Pittsburgh
- Marc Antoine Jerome, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1956, Evette Philippe Guerrier; M.D. 1962, Université d'Etat d'Haiti
- Marilyn Concetta Jerome, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.S. 1974, Xavier University; M.D. 1978, University of Cincinnati
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B.A. 1984, Yale University; M.D. 1986, Albany Medical College
- Simon Kipersztok, *Instructor in Obstetrics and Gynecology*  
B.A. 1979, Brandeis University; M.D. 1983, Tufts University
- Hanna Klaus, *Associate Clinical Professor of Obstetrics and Gynecology*  
A.B. 1948, M.D. 1950, University of Louisville



- Deena Adrian Kleimerman, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA 1975, Case Western Reserve University; M.D. 1980, George Washington University
- Bradford Allan Kleinman, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS 1972, M.D. 1976, University of Maryland
- Edward Graeme Koch, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA 1964, MA 1965, University of California, Los Angeles; M.D. 1969, George Washington University
- Israel Kogan, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA 1965, New York University; M.D. 1969, State University of New York at Buffalo
- Edward Ronald Kolvereid, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS 1956, Ohio University; M.D. 1960, Ohio State University
- Herbert Louis Kotz, *Clinical Professor of Obstetrics and Gynecology*  
AB 1953, M.D. 1956, George Washington University
- Hans Bartold Krebs, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1974, University of Hamburg
- Helam Jody Landy, *Assistant Professor of Obstetrics and Gynecology*  
BA 1978, Hobart University; M.D. 1982, Northwestern University
- John Walter Larsen, Jr., *Professor of Obstetrics and Gynecology*  
BA 1969, Dartmouth College; M.D. 1969, Cornell University
- Melissa Ellen Larsen, *Assistant Clinical Professor of Obstetrics and Gynecology*  
AB 1977, Smith College; M.D. 1981, Cornell University
- Allan Michael Lazarus, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA 1965, City University of New York, Brooklyn College; M.D. 1969, New York University
- Among Iekagul, *Assistant Clinical Professor of Obstetrics and Gynecology*  
M.D. 1965, Chulalongkorn University, Thailand
- Jan Coleman Leonard, *Adjunct Assistant Professor of Obstetrics and Gynecology*  
BS 1972, University of Richmond; Ph.D. 1981, Medical College of Virginia of Virginia Commonwealth University
- Leonard S. Levine, *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1955, State University of New York Downstate Medical Center
- Robert Howard Levitt, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA 1968, M.D. 1972, State University of New York at Buffalo
- Michael Jeremy Levy, *Instructor in Obstetrics and Gynecology*  
M.Sc. B. 1982, University of Cape Town, South Africa
- Steven Howard Lipsius, *Associate Clinical Professor of Psychiatry and Behavioral Sciences and of Obstetrics and Gynecology*  
BS 1962, Saint Joseph's University; M.D. 1963, MA 1965, Temple University
- Bart Allan Litman, *Associate Clinical Professor of Obstetrics and Gynecology*  
BA 1973, Clark University; M.D. 1977, Georgetown University
- Leon McNeely Liverett, *Associate Clinical Professor of Obstetrics and Gynecology*  
BS 1943, Butler University; M.D. 1945, Indiana University
- John William Lyles, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BME 1964, Cornell University; M.D. 1970, George Washington University
- Richard Sheldon Margolis, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS 1965, Pennsylvania State University; M.D. 1966, George Washington University
- David Mervyn Margulies, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS 1959, Columbia University; M.D. 1961, Northwestern University
- Stanley C. Marinoff, *Clinical Professor of Obstetrics and Gynecology*  
AB 1958, University of Pennsylvania; M.D. 1962, University of Health Sciences/Chicago Medical School  
MPH 1970, Harvard University
- John Lloyd Marlow, *Assistant Professor of Obstetrics and Gynecology*  
BS 1967, Brigham Young University; M.D. 1968, George Washington University
- Leon Alphonse Martel, *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1967, Georgetown University
- Dean Harrington Martin, *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1950, George Washington University
- Marina I. Martinez, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA 1973, Catholic University; M.D. 1978, Temple University
- Christos Mastrovannis, *Assistant Clinical Professor of Obstetrics and Gynecology*  
M.D. 1979, Athens University
- Larry McGowan, *Professor of Obstetrics and Gynecology*  
BS 1966, Millikan University; BS in Med 1952, M.D. 1954, University of Illinois

- Imad S. Mufarrij, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1973, M.S. 1975, M.D. 1980, American University of Beirut, Lebanon
- John Stephen Naulty, *Associate Professor of Anesthesiology and of Obstetrics and Gynecology*  
B.A. 1968, Duke University; M.D. 1972, Thomas Jefferson University
- Eslam Steven Nawab, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1961, Dr.Med. 1965, University of Dusseldorf, Germany
- Keith Henderson Neblett, *Assistant Clinical Professor of Obstetrics and Gynecology*  
M.D. 1970, Howard University
- Norman Morris Neches, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.A. 1964, Cornell University; M.D. 1968, State University of New York Downstate Medical Center
- Lawrence Merle Nelson, *Assistant Professor of Obstetrics and Gynecology*  
B.S. 1969, Westminster College (Pennsylvania); M.D. 1973, University of Pittsburgh
- Richard S. Newman, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1974, Tufts University; M.D. 1978, George Washington University
- Barbara M. Nies, *Assistant Professor of Obstetrics and Gynecology*  
B.A. 1980, Mount Holyoke College; M.D. 1984, Michigan State University
- Ronald Julian Orleans, *Associate Clinical Professor of Obstetrics and Gynecology*  
A.B. 1965, Franklin and Marshall College; M.D. 1969, George Washington University
- John C. Pan, *Clinical Professor of Obstetrics and Gynecology*  
B.S. 1966, University of Notre Dame; M.D. 1970, George Washington University
- John Douglas Paulson, *Associate Clinical Professor of Obstetrics and Gynecology*  
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- Walter Reams Perkins, *Assistant Clinical Professor of Obstetrics and Gynecology*  
B.S. 1957, University of Richmond; M.D. 1961, Medical College of Virginia of Virginia Commonwealth University
- David Neil Powers, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1973, Dartmouth College; M.D. 1977, University of Pennsylvania
- Peter Demetrios Protos, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1958, University of Athens, Greece
- Louis Quain Pugsley, *Clinical Professor of Obstetrics and Gynecology*  
A.B. 1954, Hamilton College; M.D. 1958, Cornell University
- Luis Carlos Radice, *Associate Clinical Professor of Obstetrics and Gynecology*  
M.D. 1957, University of Buenos Aires, Argentina
- Gerald Robert Renzi, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.S. 1976, Georgetown University; M.D. 1980, Howard University
- Manjit Kaur Risam, *Assistant Clinical Professor of Obstetrics and Gynecology*  
M.B., B.Sc. 1971, Delhi University, India
- Albert Irving Robins, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.S. 1937, George Washington University; M.D. 1941, Georgetown University
- Charles Clanton Rogers, *Professor of Radiology (Radiation Therapy) and of Obstetrics and Gynecology*  
B.A. 1956, Maryville College (Tennessee); M.D. 1960, University of Arkansas
- Myron Rose, *Assistant Clinical Professor of Gynecology*  
B.A. 1958, City University of New York, Brooklyn College; M.S. 1960, Northwestern University; M.D. 1967, University of Missouri
- Leonard Asher Rosen, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1971, M.D. 1976, George Washington University
- Michael A. Ross, *Clinical Professor of Obstetrics and Gynecology*  
B.S. 1971, Dickinson College; M.D. 1975, George Washington University
- Barry Stephen Rothman, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1971, M.D. 1975, George Washington University
- Josiah Sacks, *Clinical Professor of Obstetrics and Gynecology*  
B.S. 1941, Providence College; M.D. 1945, Tufts University
- Julian Edwin Safran, *Associate Clinical Professor of Obstetrics and Gynecology*  
B.A. 1972, M.D. 1975, George Washington University
- Melvin Weslev Sandmeyer, Jr., *Clinical Professor of Obstetrics and Gynecology*  
B.A. 1950, M.D. 1953, George Washington University
- Cesare Federico Santangelo, *Clinical Instructor in Obstetrics and Gynecology*  
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BS 1975, Rensselaer Polytechnic Institute; M.D. 1975, Emory University

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M.D. 1957, Ph.D. 1957, Northwestern University

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M.D. 1947, Georgetown University

James Glover Sites, *Professor of Obstetrics and Gynecology*  
M.D. 1947, George Washington University

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BS 1967, Saint Peter's College; M.D. 1971, George Washington University

Moses N. Steren, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA 1954, M.D. 1959, Udon University, Argentina

Steele Fuller Stewart, Jr., *Associate Clinical Professor of Obstetrics and Gynecology*  
AB 1950, Carleton College; M.D. 1959, University of Pennsylvania

Robert Joseph Stillman, *Professor of Obstetrics and Gynecology*  
BA 1969, Boston University; M.D. 1973, Georgetown University

Nelson Monroe Tart, *Clinical Professor of Obstetrics and Gynecology*  
BS 1949, Wake Forest University; M.D. 1955, George Washington University

W. Scott Taylor, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BS 1957, Ursinus College; M.D. 1961, Jefferson Medical College

Mari Paule Thiett, *Instructor in Obstetrics and Gynecology*  
BA 1981, Stanford University; M.D. 1985, University of Texas at Dallas

Elijah White Titus, Jr., *Clinical Professor of Obstetrics and Gynecology*  
M.D. 1952, George Washington University

Philip John UrsO, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA 1959, New York University; M.D. 1963, New Jersey College of Medicine and Dentistry

Marc Vatin, *Assistant Clinical Professor of Obstetrics and Gynecology*  
BA 1963, Lycée Charles de Gaulle, France; M.D. 1971, University of Marseille, France; MPH 1979, University of North Carolina

William Davies Wallace, Jr., *Associate Clinical Professor of Obstetrics and Gynecology*  
BS 1949, Westminster College (Pennsylvania); M.D. 1953, Thomas Jefferson University

Allan Byrne Weingold, Oscar I. and Mildred S. Dodek, *Professor of Obstetrics and Gynecology*  
BA 1951, Oberlin College; M.D. 1955, New York Medical College

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AB 1948, Temple University; M.D. 1952, Hahnemann Medical College

## Ophthalmology

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M.D. 1982, University of Damascus, Syria

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BA 1944, M.D. 1945, University of Virginia

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BA 1947, M.D. 1952, American University of Beirut, Lebanon; MS 1957, University of Iowa

David Kip Berler, *Assistant Clinical Professor of Ophthalmology*  
AB 1955, M.D. 1958, Cornell University

Blackwell Smith Bruner, *Clinical Instructor in Ophthalmology and in Pediatrics*  
M.D. 1963, George Washington University

Jocia Camille Bull, *Assistant Clinical Professor of Ophthalmology*  
AB 1971, Princeton University; M.D. 1978, Tufts University

- David Thornhill Casey, *Assistant Clinical Professor of Ophthalmology*  
B.S. 1960, University of Pittsburgh; M.D. 1961, Hahnemann Medical College
- Wiley Andrew Chambers II, *Adjunct Assistant Professor of Computer Medicine and of Ophthalmology*  
B.A. 1980, Colgate University; M.D. 1983, George Washington University
- Richard Martin Chavis, *Adjunct Assistant Professor of Ophthalmology*  
B.A. 1968, M.S. 1967, Rutgers University; M.D. 1971, University of Missouri
- Robert Day, *Assistant Clinical Professor of Ophthalmology*  
A.B. 1936, Harvard University; M.D. 1943, Johns Hopkins University
- Ronald Stuart Deitch, *Clinical Instructor in Ophthalmology*  
A.B. 1981, Washington and Lee University; M.D. 1984, George Washington University
- Gerald F. Dewitt, *Assistant Clinical Professor of Ophthalmology*  
B.A. 1974, University of Notre Dame; M.D. 1983, Georgetown University
- Paul Austin Dorn, Jr., *Clinical Instructor in Ophthalmology*  
A.B. 1954, St. Anselm's College; M.D. 1965, Georgetown University
- Anne Elizabeth Eager, *Assistant Clinical Professor of Ophthalmology*  
M.D. 1967, Georgetown University
- Bernard Ehrlich, *Clinical Instructor in Ophthalmology*  
B.S. 1952, M.B., B.Sc. 1956, Durham University, England
- Charles Harry Epps III, *Clinical Instructor in Ophthalmology*  
A.B. 1978, Harvard University; M.D. 1983, Johns Hopkins University
- Ben Sion Fine, *Associate Research Professor of Ophthalmology*  
M.D. 1983, University of Toronto, Canada
- Lawrence S. Frank, *Clinical Instructor in Ophthalmology*  
M.D. 1980, George Washington University
- Leonard Malcolm Friedman, *Clinical Instructor in Ophthalmology*  
B.A. 1965, University of Pennsylvania; M.D. 1969, George Washington University
- David Stern Friendly, *Professor of Ophthalmology and of Pediatrics*  
B.A. 1954, Carleton College; M.D. 1958, Columbia University
- Richard A. Garfinkel, *Clinical Instructor in Ophthalmology*  
B.S. 1970, University of Michigan; M.D. 1983, New York University
- Maurice Leonard Gaspar, *Clinical Instructor in Ophthalmology*  
B.A. 1974, City University of New York, Brooklyn College; M.D. 1977, Yeshiva University
- Paul Theodore Gavaris, *Assistant Clinical Professor of Ophthalmology*  
B.S. 1961, Rutgers University; M.D. 1968, George Washington University
- Craig Erwin Geist, *Assistant Clinical Professor of Ophthalmology*  
B.A. 1978, College of Wooster; M.S. 1983, George Washington University; M.D. 1984, Medical College of Virginia of Virginia Commonwealth University
- William Steven Gilbert, *Associate Clinical Professor of Ophthalmology*  
A.B. 1967, Cornell University; M.D. 1969, Yeshiva University
- William Bambridge Glew, *Associate Clinical Professor of Ophthalmology*  
B.S. 1950, Yale University; M.D. 1955, George Washington University; M.D. 1957, University of Minnesota
- Herbert Bennett Gould, *Assistant Clinical Professor of Ophthalmology and of Pediatrics*  
B.S. 1967, City University of New York, Brooklyn College; M.D. 1971, New York University
- Douglas Fielder Greer, *Adjunct Assistant Professor of Ophthalmology*  
B.A. 1961, Princeton University; M.D. 1966, Columbia University
- William Henry Hall, *Clinical Instructor in Ophthalmology*  
B.S. 1971, Howard University; M.D. 1975, State University of New York at Buffalo
- Sadeer Basim Hannush, *Clinical Instructor in Ophthalmology*  
B.S. 1978, University of Michigan; M.D. 1982, Wayne State University
- Richard Huberman, *Clinical Instructor in Ophthalmology*  
B.S. 1959, City University of New York, City College; M.D. 1963, University of Health Sciences Chicago Medical School
- William Siti Nagib Ibrahim, *Assistant Clinical Professor of Ophthalmology*  
M.B., B.Ch. 1988, Alexandria University, Egypt
- Mohamad Sami Jaafar, *Assistant Professor of Ophthalmology and of Pediatrics*  
B.S. 1974, M.D. 1978, American University of Beirut, Lebanon
- Thomas Patrick Keenan, *Assistant Clinical Professor of Ophthalmology*  
B.S. 1963, Manhattan College; M.D. 1967, Georgetown University



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BS. 1948, Louisiana Tech University; MD. 1953, Louisiana State University in New Orleans
- Malvin Donald Krinn, *Assistant Clinical Professor of Ophthalmology*  
MD. 1965, University of Illinois
- David Lloyd Lanter, *Clinical Instructor in Ophthalmology*  
BS. 1959, City University of New York, Queens College; MD. 1963, New York Medical College
- Francis Gerald La Prana, *Adjunct Professor of Ophthalmology*  
MD. 1962, George Washington University
- Jacqueline Anne Leavitt, *Assistant Professor of Ophthalmology*  
BA. 1974, Mount Holyoke College; MD. 1978, Wayne State University
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BA. 1955; MD. 1958, George Washington University; MS. 1964, Marquette University
- John Hayes Lodge, *Assistant Clinical Professor of Ophthalmology*  
AB. 1947, West Virginia University; MD. 1951, Johns Hopkins University
- Neil F. Martin, *Clinical Instructor in Ophthalmology*  
AB. 1972, Harvard University; MD. 1976, Johns Hopkins University
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BS. 1978, State University of New York at Stony Brook; MD. 1982, University of Pennsylvania
- Stephen Stavros Pappas, *Assistant Clinical Professor of Ophthalmology*  
BS. 1952; MD. 1956, George Washington University
- Edward Samuel Parelhoff, *Assistant Clinical Professor of Ophthalmology and of Pediatrics*  
BA. 1975; MD. 1978, Johns Hopkins University
- Marshall Miller Parks, *Clinical Professor of Ophthalmology and of Pediatrics*  
AB. 1949, Illinois College; MD. 1943, St. Louis University
- Kenn Ira Perman, *Assistant Clinical Professor of Ophthalmology*  
MD. 1979, George Washington University
- I. Edward Perraut, *Clinical Instructor in Ophthalmology*  
AB. 1971, Princeton University; MD. 1975, University of Maryland
- Arthur Raymond Pilkerton, Jr., *Assistant Clinical Professor of Ophthalmology*  
BS. 1956; MD. 1960, Georgetown University
- Harold Irvin Rodman, *Clinical Instructor in Ophthalmology*  
BA. 1952, Johns Hopkins University; MD. 1956, University of Maryland
- Nancy Josette Ronshem, *Assistant Clinical Professor of Ophthalmology*  
BS. 1964; MD. 1971, Cornell University; MAT. 1965, Harvard University
- Don Elliot Schwartz, *Assistant Clinical Professor of Ophthalmology*  
BS. 1963, City University of New York, Queens College; MD. 1967, Yeshiva University
- James Walter Slack, *Assistant Professor of Ophthalmology*  
BA. 1960, Western Maryland College; MD. 1964, Jefferson Medical College
- Joseph Snyder, *Assistant Clinical Professor of Ophthalmology*  
AB. 1954, University of Pennsylvania; MD. 1962, Thomas Jefferson University
- Bert Bahgat Sourval, *Clinical Instructor in Ophthalmology*  
MD. 1961, 1962, Cairo University, Egypt
- Frank Anthony Spellman, *Assistant Clinical Professor of Ophthalmology*  
BA. 1973, Johns Hopkins University; MD. 1977, University of California, San Francisco
- Henry Joseph Starr, *Clinical Instructor in Ophthalmology*  
BA. 1955, Bowdoin College; MD. 1959, Johns Hopkins University
- Robert Frederic Stephens, *Assistant Clinical Professor of Ophthalmology*  
BS. 1967, University of Oklahoma; MD. 1971, Washington University
- Samuel Stoleru, *Assistant Clinical Professor of Ophthalmology*  
BS. 1961, Colegio Hebreo Jorge Isaacs, Colombia; MD. 1968, Universidad del Valle, Colombia
- Samuel Sheldon Stopak, *Clinical Instructor in Ophthalmology*  
BS. 1979, George Washington University; MD. 1984, Emory University
- Roberto Novarro Sunga, *Assistant Clinical Professor of Ophthalmology*  
MD. 1958, University of the Philippines
- Evadne Marjorie Titer, *Assistant Clinical Professor of Ophthalmology*  
BS. 1963; MD. 1967, Howard University
- Manfred A. Von Fricken, *Assistant Clinical Professor of Ophthalmology*  
AB. 1971, MMS. 1973, Rutgers University; MD. 1975, Washington University

David Murray Wanicur, *Assistant Clinical Professor of Ophthalmology*

BA 1961, University of Pennsylvania; MD 1965, University of Pittsburgh

Paul Vernon Whitmore, *Associate Professor of Ophthalmology*

B.S. 1962, M.D. 1966, University of Michigan

Henry Sindos Wicker, *Assistant Clinical Professor of Ophthalmology*

B.S. 1948, Xavier University; MD 1953, Howard University

John Sam Zacharia, *Associate Professor of Ophthalmology*

B.S. 1964, M.D. 1968, American University of Beirut, Lebanon

Kenneth Howard Zaslou, *Adjunct Assistant Professor of Ophthalmology*

BA 1961, City University of New York, Brooklyn College; MD 1973, Union University

Ernest Michael Zimmerman, *Assistant Clinical Professor of Ophthalmology*

MD 1963, University of Toronto, Canada

Mervin Harvey Zimmerman, *Assistant Clinical Professor of Ophthalmology*

MD 1959, University of Toronto

## Orthopaedic Surgery

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John Broner Cohen, *Clinical Instructor in Orthopaedic Surgery*

BA 1972, University of Pennsylvania; MD 1978, George Washington University

Doreen Di Pasquale, *Instructor in Orthopaedic Surgery*

B.S. 1981, M.D. 1985, George Washington University

Andrew Ivo Dobranski, *Assistant Clinical Professor of Orthopaedic Surgery (Anatomy)*

MD 1954, Medical Academy of Warsaw, Poland

Robert Leroy Dow, *Associate Clinical Professor of Orthopaedic Surgery*

AB 1944, M.D. 1948, Cornell University

Thomas Bernard Fleeter, *Clinical Instructor in Orthopaedic Surgery*

BA 1973, M.B.A. 1975, Northwestern University; MD 1979, Howard University

Ulla M-Son Fortune, *Associate Clinical Professor of Orthopaedic Surgery*

MD 1965, George Washington University

William Patrick Fortune, *Professor of Orthopaedic Surgery and of Medicine*

B.S. 1953, Springfield College; M.D. 1965, George Washington University

Melinda Miller Gardner, *Assistant Clinical Professor of Orthopaedic Surgery*

BA 1965, Duke University; M.D. 1974, George Washington University

Harold Bruce Glickman, *Assistant Clinical Professor of Orthopaedic Surgery*

BA 1967, Emory University; D.P.M. 1971, Pennsylvania College of Podiatric Medicine

James Henry Graeter, *Assistant Clinical Professor of Orthopaedic Surgery*

B.S. 1970, M.D. 1974, Georgetown University

Stephen Flack Gunther, *Professor of Orthopaedic Surgery*

BA 1963, Yale University; M.D. 1967, Union University

Stephen Samuel Haas, *Associate Clinical Professor of Orthopaedic Surgery*

MD 1965, University of Oklahoma

Dennis Louis Hart, *Assistant Clinical Professor of Orthopaedic Surgery*

B.S. 1971, Northeastern University; M.P.A. 1976, New Haven University; Ph.D. 1985, West Virginia University

Jack Wayne Harvey, *Clinical Instructor in Orthopaedic Surgery*

B.S. 1959, M.D. 1963, George Washington University

Robert John Heilen, *Clinical Instructor in Orthopaedic Surgery*

B.Ch.E. 1957, The Couper Union; M.D. 1964, New York University

David Charles Johnson, *Assistant Clinical Professor of Orthopaedic Surgery*

B.S. 1969, M.D. 1974, Yale University

Stephen Jeremy Kominsky, *Clinical Instructor in Orthopaedic Surgery*

B.S. 1974, University of Maryland; D.P.M. 1982, Pennsylvania College of Podiatric Medicine

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MD 1956, University of Athens, Greece

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M.D. 1947, Georgetown University
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BA 1965, Yale University; M.D. 1969, Harvard University
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- Norman Aaron Marcus, *Clinical Instructor in Orthopaedic Surgery*  
BA 1974, Johns Hopkins University; M.D. 1978, Stanford University
- Kathleen Ann McHale, *Clinical Instructor in Orthopaedic Surgery*  
BS 1971, Villanova University; M.D. 1975, Medical College of Pennsylvania
- Peter Alan Moskovitz, *Associate Clinical Professor of Orthopaedic Surgery*  
BA 1954, Haverford College; M.D. 1969, Columbia University
- Robert Jon Neviasser, *Professor of Orthopaedic Surgery*  
AB 1958, Princeton University; M.D. 1962, Thomas Jefferson University
- Thomas Jay Neviasser, *Associate Clinical Professor of Orthopaedic Surgery*  
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BS 1964, City University of New York, Queens College; M.D. 1968, State University of New York Upstate Medical Center
- Gary Clayton Schwartzbach, *Clinical Instructor in Orthopaedic Surgery*  
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- Raymond Thal, *Clinical Instructor in Orthopaedic Surgery*  
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- Michael David Thomas, *Assistant Professor of Orthopaedic Surgery and of Pediatrics*  
BS 1970, Texas A&M University; MS 1978, Prairie View A&M University; M.D. 1981, Howard University
- Laura Lowe Tosi, *Assistant Professor of Orthopaedic Surgery and of Pediatrics*  
BA 1971, Boston University; M.D. 1977, Harvard University
- Anthony Steven Unger, *Assistant Clinical Professor of Orthopaedic Surgery*  
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196 School of Medicine and Health Sciences

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## Index

- Abbreviations, key to, 63  
Academic performance, evaluation of, 25  
Academic progress, satisfactory, MD program, 33  
Academic status (accreditation) of the University, 5  
Administration, officers of  
    Of the University, 8  
    Of the Medical Center, 9  
Admission  
    To M.D. Program, 20  
    To M.P.H. program, 38  
    To undergraduate programs, 44  
    *See also* program concerned  
Advanced standing, 21, 46  
    *See also* program concerned  
Alumni associations, 18  
Anatomy, 64  
Anesthesiology, 65  
Associate in Science degree programs, 51  
Auditing, 42, 49  
Awards, for MD students, 35  
  
Bachelor of Science degree programs, 55  
Bachelor of Science in Health Science degree programs, 54  
Balance sheet, 49  
Biochemistry and molecular biology, 66  
Certificate programs, 61  
Changes in program of study, 42, 49  
Clinical Sciences, *see* Interdisciplinary courses  
Committees, 18  
Computer medicine, 67  
Continuous enrollment, 43, 50  
Course numbers, explanation of, 63  
Credit, 42, 49  
  
Dean's list, 48  
Dermatology, 67  
Dishonesty, academic, 30  
Dismissal from the University, 10  
    *See also* program concerned  
Doctor of Medicine degree program  
    Admission, 20  
    Joint degree programs, 23  
    Program of study, 22  
    Regulations, 25  
Drugs, University policy on, 11  
  
Emergency medical services program, 55  
Emergency medicine, 68  
Equal opportunity, University policy on, 6  
  
Facilities, 16  
Faculty and staff of instruction, 108  
Fees and financial regulations, 11  
Financial aid  
    For M.D. students, 33  
    For M.P.H. students, 43  
    For undergraduates, 51  
  
Graduation requirements, *see* Regulations for program concerned  
  
Health care sciences, 71  
Health sciences, undergraduate programs in, 44  
Health service, student, 15  
Honor societies, for M.D. students, 37  
Honors, 22, 50  
Housing and residence life, 15  
  
Insurance, health and accident, 15  
Interdisciplinary courses, 80  
Irregular progress, 28  
  
Leave of absence, *see* Regulations for program concerned  
Libraries, 11, 16  
Loan funds, *see* Financial aid for program concerned  
  
Master of Public Health degree program, 38  
Medical laboratory technique program, 52  
Medical technology  
    Degree program, 56  
    Certificate program, 61  
Medicine, 80  
Microbiology and immunology, 80



- Neurological surgery, 87
- Neurology, 88
- Nondegree students, *see* Unclassified students
- Nuclear medicine technology
  - Degree program, 52
  - Certificate program, 61
- Nurse practitioner certificate program, 61
- Nursing anesthesia program, 57
- Obstetrics and gynecology, 88
- Ophthalmology, 89
- Orthopaedic surgery, 89
- Pathology, 89
- Pediatrics, 92
- Pharmacology, 94
- Physician assistant
  - Degree program, 58
  - Certificate program, 62
- Physiology, 96
- Prehospital clinical medicine program, 53
- Probation, 39, 48
- Professional comportment, evaluation of, 29
- Programs, right to make changes in, 11
- Property responsibility, 11
- Psychiatry and behavioral sciences, 97
- Public health, 98
- Radiation therapy technology
  - Degree program, 53
  - Certificate program, 62
- Radiological sciences and administration program, 60
- Radiologic technology program, 54
- Radiology, 101
- Readmission, 41, 47
- Refunds, 14
- Regulations, 10
  - Financial, 11
  - for M.D. students, 25
  - for M.P.H. students, 42
  - for undergraduates, 48
- Residence requirements, *see* program concerned
- Rules, right to change, 11
- Scholarship requirements, 41, 48
  - see also* program concerned
- Scholarships, *see* Financial aid for program concerned
- Student life, 15
- Student information, release of, 10
- Surgery, 105
- Suspension, 41, 48
- Transcripts, 50
- Transfer credit, 39, 46
- Transfer within the University, 49
- Trustees, board of, 6
- Tuition and other fees, 11
- Unclassified students, 43, 46
- Undergraduate programs, 44
- Urology, 107
- Veterans benefits, *see* Financial aid for program concerned
- Withdrawal, 14
  - See also* Regulations for program concerned

## Degrees Offered by The George Washington University

*Columbian College of Arts and Sciences:* Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), and Bachelor of Science (B.S.)

*Graduate School of Arts and Sciences:* Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Music (M.Mus.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

*School of Medicine and Health Sciences:* Associate in Science (A.S.), Bachelor of Science (B.S.), Master of Public Health (MPH), and Doctor of Medicine (M.D.)

*National Law Center:* Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

*School of Engineering and Applied Science:* Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

*School of Education and Human Development:* Bachelor of Arts in Education and Human Development (B.A. in Ed.&H.D.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

*School of Business and Public Management:* Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Master of Urban and Regional Planning (M.U.&R.P.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.).

*Elliott School of International Affairs:* Bachelor of Arts (B.A.) and Master of Arts (M.A.)





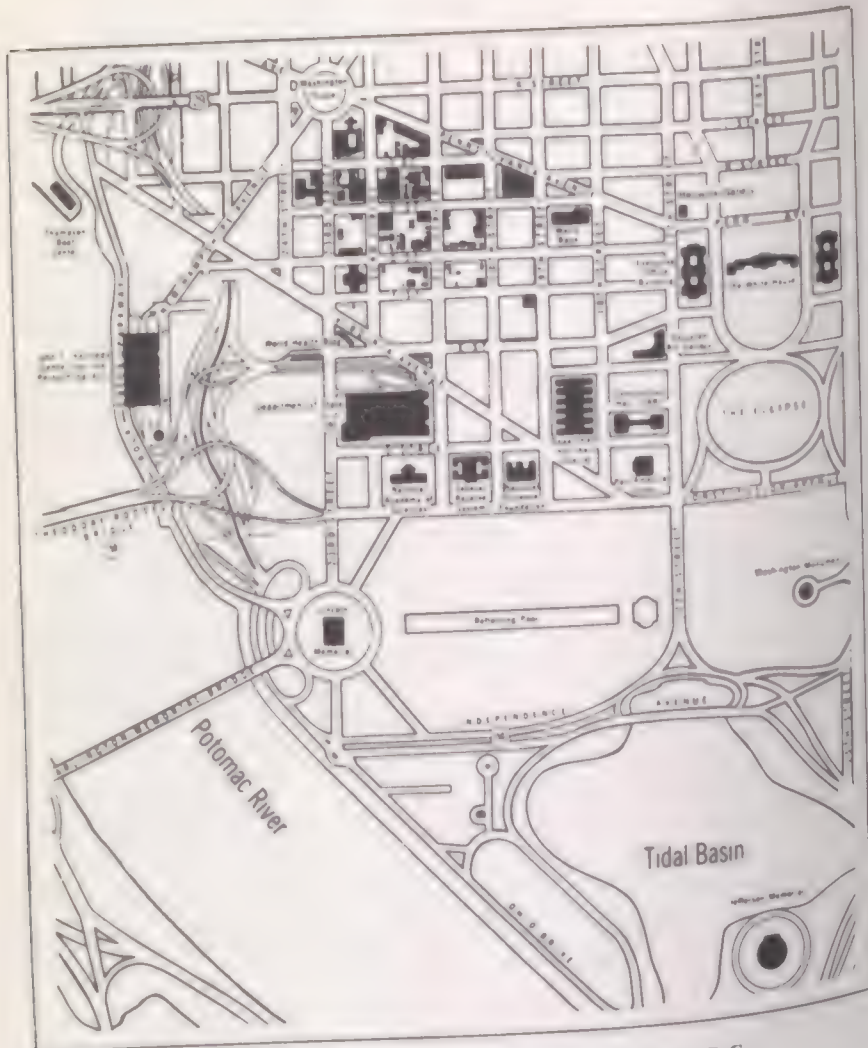
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# The George Washington University Bulletin

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National Law Center  
1991-1992

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052, telephone (202) 994-1000. For information concerning Undergraduate Programs, Graduate Programs, or the School of Medicine and Health Sciences, please request the appropriate Bulletin.

The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible



## Contents

### Page

4	Academic Calendar
5	The National Law Center
7	The Juris Doctor Degree
7	Entrance Requirements
7	Admission
8	Degree Requirements
9	Academic Regulations
14	Joint Juris Doctor-Master's Degree Programs
14	Graduate Programs
14	The Master of Laws Degree
21	The Doctor of Juridical Science Degree
23	Fees and Financial Regulations
26	Financial Aid
28	Prizes
29	General Information
29	Day and Evening Classes
29	Summer Session
29	Registration
29	Graduation Requirements
30	Transcripts of Record
30	Student Activities and Student Life
30	Enrichment Program
30	Publications
30	Moot Court
31	Law Center Student Organizations
31	Facilities and Services
31	The National Law Center
31	The Jacob Burns Law Library
32	Career Development and Placement Services
32	Continuing Legal Education
32	Housing
32	Food Service
33	The Cloyd Heck Marvin Center
33	The Charles E. Smith Center
33	Student Health Service
34	Disabled Student Services
34	University Regulations
37	Courses of Instruction
37	The University
37	The Board of Trustees of the University
37	Officers of Administration
37	Alumni Associations
37	Faculty and Staff of Instruction
37	Index

## The Academic Calendar 1991-1992\*

### 1991 Fall Semester

<i>August 21-23</i>	Fall orientation and registration for new students
<i>August 26</i>	Classes begin
<i>September 2</i>	Labor Day (holiday)
<i>September 13</i>	Deadline for Credit/No Credit option
<i>October 1</i>	Application for February graduation due
<i>October 12</i>	S.J.D. dissertations of candidates for February graduation due
<i>November 28-29</i>	Thanksgiving holiday
<i>December 3</i>	Constructive Thursday (makeup for Thanksgiving holiday)
<i>December 4</i>	Constructive Friday (makeup for Thanksgiving holiday)
	Last day of fall semester classes
	LL.M. theses of candidates for February graduation due
<i>December 5-6</i>	Reading period
<i>December 9-20</i>	Examination period

### 1992 Spring Semester

<i>January 10</i>	Registration for those not registered during the fall
<i>January 13</i>	Classes begin
<i>January 20</i>	Martin Luther King, Jr., Day (holiday)
<i>January 25</i>	S.J.D. dissertations of candidates for May graduation due
<i>January 31</i>	Deadline for Credit/No Credit option
<i>February 1</i>	Application for May graduation due
<i>February 16</i>	Winter Convocation
<i>February 17</i>	George Washington's birthday observed (holiday)
<i>March 13</i>	Spring recess begins after last class
<i>March 23</i>	Classes resume
<i>April 29</i>	Constructive Monday (makeup for Martin Luther King, Jr., Day)
	Last day of spring semester classes
	LL.M. theses of candidates for June graduation due
<i>April 30-May 1</i>	Reading period
<i>May 4-19</i>	Examination period
<i>May 31</i>	Commencement

\*The Academic Calendar is subject to change



## The National Law Center

### History

The Law Center, the oldest law school in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. The building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law Center until 1884.

Sixty graduates, from 22 of the then 37 states, received degrees in 1867. The school continued to have a student body and a faculty that reflected the fact that it was at the seat of our nation's government. Supreme Court Justices David J. Brewer and John Marshall Harlan were among the prominent members of the bench and bar who were on the faculty.

In 1877, one year after the first such program was adopted in the United States, the Law Center instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The Law Center took part in 1900 in the organization of the Association of American Law Schools.

In the past quarter-century the Law Center expanded its course and seminar offerings with consideration of the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. In 1946, the Law Center began accepting foreign attorneys into specially designated programs. Today, lawyers from other countries are accepted into the Master of Laws program.

In 1954, the National University School of Law, which had held an important place in legal education in the District of Columbia since 1869, was absorbed by the George Washington University Law School.

Since 1954, programs of special research and study have enriched the basic curriculum. At present these include Environmental Law; Intellectual Property Law; International and Comparative Law; Land Use Management and Control Law; and Government Contracts. The academic courses reflect the breadth in public law for which the Law Center is well known.

Additionally, the Law Center has been a leader in developing a curriculum to meet the legal needs of the poor and the disadvantaged. A clinical law program has been developed that is the equal of that at any law school in the nation. Special projects include the Consumer Protection Center, the Community Legal Clinic, Clinical Studies in Environmental Law. Students in Court, and individual projects supervised by the Law Students Civil Rights Research Council.

### Location in the Nation's Capital

Of special significance is the location of the National Law Center in a central area of the nation's capital, the focal point of the law in action, both American and international. The work of the Center goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and federal courts of special jurisdiction, such as the United States Court of Appeals for the Federal Circuit, the United States Tax Court, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission in the field

of transportation, the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Energy Regulatory Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the federal government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by George Washington University for use by research students in international and comparative law, fields with respect to which Washington has come to be called "The Capital of the World."

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University National Law Center is the government of the United States. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized, and whatever the community in which the student plans to practice.

### Objectives

The purpose of the National Law Center is to prepare men and women to meet the needs of society in many fields of law and to encourage scholarly research and writing in the law. As a national law school, the Center does not emphasize any particular geographic area in its instruction; therefore, it prepares students to practice law in any part of the country. The Center also offers a program of legal education for foreign students. The Law Center seeks to fulfill these objectives through a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors; an extensive clinical law program in which students learn legal skills by actual practice; two law journals that specialize in public law and international law; trial practice; participation in the Van Vleck Appellate Case Club and several other moot court competitions; a series of student professional co-curricular activities; studies on an advanced level for foreign as well as for American students; a continuing legal education program for members of the bar; providing them with opportunities for course work within the curriculum, and scholarly research and writing in the law.

### Student Body

The National Law Center has a total enrollment of about 1,600 students. Approximately 1,000 students are in the full-time day division for the J.D. degree and 300 are enrolled in the part-time evening division. More than 200 students, many from abroad, are enrolled in the post-J.D. degree programs.



## **The Juris Doctor Degree**

### **Entrance Requirements**

Admission to the Juris Doctor degree program requires a bachelor's degree from an accredited college or university and a strong academic record. The Admissions Committee takes into account both the grades and the distribution of courses. The Admissions Committee considers personal and scholastic achievements, recommendations (if submitted), and the results of the Law School Admission Test (LSAT). The Committee also seeks social, ethnic, cultural, and geographical diversity in the student body. In the selection process, there is no discrimination against any applicant because of sex, race, color, religion, handicap, or national origin.

Information concerning the Law School Admission Test may be obtained from the Admissions Office of the National Law Center or from Law Services, Box 2001, Newtown, Pennsylvania 18940. The test is administered at various centers in the United States. Testing dates are usually in September, December, February, and June. Completed application forms must be received by Law Services at least one month before the date of the test. It is not necessary to apply to the law school before taking the test.

### **Admission**

Beginning students are admitted only at the start of the fall semester. Because admission decisions are made on a rolling basis, applicants are urged to submit application forms and complete credentials well in advance of the March 1 deadline. This means that the Law School Admission Test should be taken no later than December. Application forms are available at and should be returned to the Office of Admissions of the National Law Center, George Washington University, Washington, D.C. 20052.

The applicant should register with the Law School Data Assembly Service (LSDAS) by completing and mailing the registration forms supplied by Law Services. No application to this school will be processed unless accompanied by a Law School Application Matching Form, which is found in each applicant's LSAT/LSDAS registration packet. A transcript from each college or university attended should then be sent directly to LSDAS, Box 2000-M, Newtown, Pennsylvania 18940. The LSDAS will analyze the transcript(s) and send a copy to this law school and others that ordered a report. However, the applicant will be asked, upon acceptance, to submit directly to the National Law Center a final transcript showing evidence of the receipt of a bachelor's degree.

### **Advanced Standing (Transfer Students)**

A limited number of places is available for students who wish to transfer to the National Law Center after completing one year of legal studies at a law school accredited by the American Bar Association. A maximum of 28 credit hours may be applied to the Law Center's degree requirements. The primary factor considered in an admission decision is the student's first-year performance. No applicant will be accepted for transfer who is ineligible to return in good standing to a previously attended law school. Transfer students may apply for admission to the National Law Center for either the fall or spring semester. The deadlines for submission of transfer applications are July 1 for the fall semester, December 1 for the spring semester.

### **Foreign Attorneys**

A limited number of foreign attorneys who wish to prepare for law practice in the United States may be admitted to the Juris Doctor program. A student in this program who completes 28 hours of course work at this law school with a grade

point average of 70.0 or above may be granted an additional 28 hours of advanced standing for law studies outside the U.S. and thereby earn the J.D. degree in two years. A student whose average is below 70.0 after taking 28 hours of course work must complete the full J.D. program which requires 84 hours of course work.

Students will be admitted to this program only at the start of the fall semester. The deadline for application materials is March 1, but applicants are encouraged to submit applications well in advance of the deadline.

### Visiting (Unclassified) Students

A law student who is in good academic standing as a degree candidate at an ABA-approved law school may be admitted to the National Law Center as an unclassified student and earn credit for transfer to his or her law school. Students may apply for visiting student status during the fall, spring, or summer semester. Admission will be based on the availability of space. The deadlines for application materials are July 1 for the fall semester, December 1 for the spring semester, and one month prior to the beginning of the summer session.

### Day Division/Evening Division

Once admitted to the Juris Doctor degree program, candidates are given the option of attending either the day division (full-time) or evening division (part-time) as space permits. Once enrolled, students may transfer between divisions only with the permission of the dean. See Academic Work Load, Residence, and Required Curriculum, below, for regulations governing the day and evening divisions.

### Degree Requirements

In order to earn the Juris Doctor degree, students must satisfactorily meet the following academic requirements: Completion of 84 semester hours of credit; fulfillment of the residence requirement; completion of the required curriculum; and maintenance of the minimum grade point average of 65.

### Residence

Candidates for the Juris Doctor degree must complete a residence period of three academic years. At least two academic years of residence are required of students admitted with advanced standing. Attendance as a full-time student (11 or more credit hours) for each of the fall and spring semesters constitutes residence for only one academic year, regardless of how many credits over 11 the student takes in any one semester; similar attendance as a part-time student (8-10 credits each semester) constitutes residence for three-fourths of an academic year. Consequently, a full-time student must attend six semesters to meet residence requirements; a part-time student must attend eight. Full-time students authorized to take schedules of less than 11 hours and part-time students authorized to take schedules of less than 8 hours receive residence credit on a proportional basis. Students who attend the summer session receive fractional residence credit. These residency requirements apply to all J.D. students in the National Law Center.

### Required Curriculum

#### Day Division

First-year students in the day division are required to take the following schedule of courses, which provides the basis upon which all further legal study is built: fall semester—*Contracts I*, *Torts*, *Criminal Law*, *Civil Procedure I*, and *Legal Research and Writing*; spring semester—*Contracts II*, *Property*, *Constitutional Law I*, *Civil Procedure II*, and *Introduction to Advocacy*.



During the second or third years of study, day division students must take *Constitutional Law II*, *Criminal Procedure*, *Evidence*, *Professional Responsibility and Ethics*, and the two-credit legal writing requirement.

### **Evening Division**

Evening division students must take the following schedule in their first and second years: first year, fall semester—*Contracts I*, *Torts*, and *Legal Research and Writing*; first year, spring semester—*Contracts II*, *Criminal Law*, *Constitutional Law I*, and *Introduction to Advocacy*; second year, fall semester—*Property*, *Civil Procedure I*, and 3 hours of electives; second year, spring semester—*Civil Procedure II* and 7 hours of electives.

During the second, third, or fourth years, evening division students must take *Constitutional Law II*, *Criminal Procedure*, *Evidence*, *Professional Responsibility and Ethics*, and the two-credit legal writing requirement.

### **Legal Writing Requirement**

Completion of a two-credit course, which is graded on the basis of written work (not examination), is required for the Juris Doctor degree. This requirement may be satisfied by service on the *Law Review* or the *Journal of International Law and Economics*, by satisfactory completion of a seminar or other course that requires or permits a research paper, by participation in upper-class Moot Court, or by satisfactory completion of Law 314, *Independent Legal Writing*. (See Research Papers for guidelines.)

### **Academic Regulations**

#### **Academic Work Load**

Juris Doctor candidates without substantial outside employment (no more than 20 hours a week) may take a program of studies of 15 credit hours per semester. Such students may take courses in the evening only if they take a majority of their hours in day courses. The dean is authorized to approve programs of study of more than 15 credit hours in exceptional cases, however, no program will be approved that would permit the student to complete requirements for the degree in less than 28 months after beginning the first year of law study. Students with more than 20 hours of outside employment, whether in the day or evening division, must take a limited program of studies not exceeding 10 credit hours; the minimum load is 8 credit hours, except in special cases when fewer hours may be approved by the dean for a limited time. A minimum schedule of 11 credit hours in the day division is required, except in unusual circumstances when a reduced program is authorized by the dean.

Full-time Juris Doctor students may take a maximum of 7 credit hours and part-time students may take a maximum of 5 credit hours in any summer session. This includes hours taken at other law schools' summer programs (see Summer School Credit from Other Law Schools).

After the first year, students may, with the dean's permission, transfer from one division to the other but should be advised of the residency consequences (see Residence).

#### **Student Employment**

A student taking more than 10 hours of course work must limit outside employment to not more than 20 hours. It is urged that all full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a

general rule it will compete with the time needed for adequate study and preparation, which are at the heart of a good legal education.

## Academic Evaluation

### Grades

Grades are given in numerical terms equivalent to letter grades as follows

- 85-100 A, Excellent
- 75-84 B, Good
- 65-74 C, Satisfactory
- 55-64 D, Poor—below standard for graduation
- 45-54 F, Failure

Some courses are graded on a Credit/No Credit basis (see Courses of Instruction); a student must earn a grade of 65 or above to receive credit in such a course.

In Law 220, 221, 311, 460, 461, 493, and 494, the following grading scale is used: H (Honors), P (Pass), LP (Low Pass), and NC (No Credit). For Honors, a student must do work of excellent quality, and no more than 25 percent of the class may earn this grade. No Credit is given for grades below 65.

A student who has been excused from taking a regularly scheduled examination is given the grade of I, Incomplete. See Examinations for grade upon failure to take an examination.

Credit toward the degree is given for all numerical grades between 55 and 100, with the exception of Law 220, 221, 311, 460, 461, 493, and 494 (see above). A JD student who receives a grade below 55 has the right to retake the course once, from the same or a different instructor, but only within the next academic year. However, the failing grade remains on the record.

The cumulative average of a student includes all grades in all courses taken at The National Law Center while a candidate for the degree.

No grade may be changed by an instructor after it has been posted in the law school or disclosed to the student unless there has been an error in arithmetic certified in writing as such by the instructor. A student has the right of faculty peer review of complaints of "capricious or prejudiced academic evaluation" under the regulations outlined in *The George Washington University Guide to Students' Rights and Responsibilities*.

### Honors

The degree of Juris Doctor "With Highest Honors" is awarded to those students, not exceeding three percent of the graduating class, who have obtained the highest cumulative averages of at least 85.

The degree of Juris Doctor "With High Honors" is awarded to those students with the highest cumulative averages of 80 or better. The number of students receiving degrees "With High Honors," when added to the total number of students receiving degrees "With Highest Honors," may not exceed 10 percent of the graduating class.

The degree of Juris Doctor "With Honors" is awarded to those students with the highest cumulative averages of 75 or better. The number of students receiving degrees "With Honors," when added to the total number of students receiving degrees "With High Honors" and "With Highest Honors," may not exceed 40 percent of the graduating class.

### Order of the Coif

The Order of the Coif, a national legal honor society, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University chapter was established in 1926. Members are elected each year from the highest-ranking 10 percent of the graduat-



ing Juris Doctor candidates. Only students who have completed their full course of study at the National Law Center are eligible for membership.

### **Credit/No Credit Option and Limits**

JD candidates may take, in addition to the courses regularly given on a Credit/No Credit basis, 6 semester hours of elective course work on a Credit/No Credit basis. A student must earn a grade of 65 or better to earn Credit. The Credit/No Credit option may be elected for only one course during a semester or summer session. The final date for an election of Credit/No Credit in a graded course will be the Friday of the third week of a semester or summer session. An unexcused failure to take an examination in a course or failure to submit a required research paper will result in the recording of a grade of 45 for a course taken on a Credit/No Credit basis.

No student may take more than 17 semester hours of courses graded on the basis of Credit/No Credit or Honors Pass/Low Pass/No Credit.

Students are advised to consider carefully the advisability of electing to take courses on a Credit/No Credit basis. In the opinion of the faculty, a student's election to take courses on a Credit/No Credit basis may be detrimental to the student's career in the legal profession because of the importance usually attached to grades by educational institutions and employers.

### **Examinations**

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of 45 will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course has two options. The student may comply (prior to the completion of the semester following the excused absence) with the instructor's procedure of evaluation on a Credit/No Credit basis (minimum grade of 65 required for JD candidates), or the student may have the grade of I (Incomplete) entered on the record and take the next regularly scheduled examination for a numerical grade. The examination may not be taken after exclusion for low scholarship. Permission to take an examination before the regularly scheduled date will not be granted.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the Academic Scholarship Committee, which may authorize such action as the circumstances require.

### **Research Papers**

The preparation of a research paper is required in lieu of an examination in seminars and other courses, as indicated in the course descriptions. To receive a numerical grade on a research paper, the paper must be submitted by the last day of classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester, if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When a deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course for any purpose until a paper acceptable to the instructor has been submitted; (2) the only grade the student may receive for the course is CR (Credit) or NC (No Credit). To receive credit, a

minimum grade of 65 is required for J.D. candidates. Failure to submit any paper within the deadline will result in a grade of 45. Students who are candidates for the J.D. degree may register for one course requiring a research paper in each semester; with the approval of the dean, they may register for more than one such course each semester.

The following guidelines have been approved by the faculty and are intended to apply to Law 314, *Independent Legal Writing*, and to research paper courses that satisfy the legal writing requirement. The faculty recommends that the paper's topic and length should receive specific approval by the faculty member. Furthermore, an outline should be submitted, to be followed by a draft. (The purpose of a draft, submitted during the course of the semester, is to allow the student the opportunity to improve the paper. A faculty member has the discretion to require a revised draft or to permit one if so requested by the student. A revised draft is necessary only if the professor requires it.) Approval of the topic, outline, and draft should be by a specific date. The paper should follow the Blue Book style.

### **Changes in Program of Study**

Juris Doctor degree candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may not add courses except with the permission of the dean and may drop courses only with the approval of both the instructor and the dean. Under no circumstances may a student drop a course after the last day of classes in any semester.

### **Attendance**

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

### **Exclusion and Probation for Low Scholarship**

A student whose cumulative average at the end of any semester falls below 65.0 but is above 64.0 will be put on probation. If such a student fails to raise the cumulative average to 65.0 at the end of the next semester, the student will not be permitted to register for any succeeding semester unless he or she petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such a probation.

A student whose cumulative average at the end of any semester falls below 64.0 will not be permitted to register for any succeeding semester unless the student petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such an exclusion.

A student who fails or receives a grade of No Credit in more than one course over the entire period of law study will not be permitted to register for any succeeding semester or to graduate unless the student petitions for and receives the permission of the Academic Scholarship Committee. This rule applies to all students including those in their first year of study.

Students who are registered at the time they receive notice that they will not be permitted to register for the next semester are entitled to withdraw from school and receive a full refund of the tuition paid for the semester or to complete the work for which they are registered.

For this purpose the term "semester" includes the summer session.

### **Procedure for Reinstatement**

Any student excluded may petition the Academic Scholarship Committee for reinstatement. The Committee will readmit the student if he or she can demonstrate 1) that the low grades were due to circumstances beyond his or her control and 2) that



he or she has the capacity to pursue the study of law with a definite likelihood of success. The Committee may place conditions on a student's readmission; for example, the Committee may require that the student take specific courses or it may place limits on outside employment.

### **Continuous Enrollment**

Degree candidates are expected to maintain continuous enrollment until all degree requirements are satisfied. By failing to register for one semester or more, the student is dropped from the University's rolls and must be readmitted (see Readmission below). A student who has been granted a leave of absence must maintain continuous enrollment by paying the University registration fee and having the appropriate status noted at the time of registration.

### **Leave of Absence**

After completion of the first year of study, a student may petition the dean for a leave of absence from the law school. A leave of absence will be granted only when the request is sufficiently compelling, and no leave of absence will be granted in excess of one academic year. A student who has been granted a leave of absence must comply with the University's registration procedures for maintaining continuous enrollment. Any student who does not maintain continuous enrollment while on a leave of absence will be required to petition the Academic Scholarship Committee for readmission.

### **Readmission**

A student who was previously registered but did not attend during the most recent semester (summer session excluded), and who has not been granted a leave of absence, must apply to the Academic Scholarship Committee for readmission. A readmitted student is required to satisfy the curriculum requirements existing at the time of readmission.

### **Credit for Courses Taken in Other Departments**

With the approval of the dean, second- and third-year students may take a maximum of 6 semester hours of appropriate graduate-level courses in other departments of the University; a grade of at least *B* must be received to obtain credit for such courses, and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken in other departments will count toward the total of 17 hours allowed under the Credit/No Credit option.

### **Summer School Credit from Other Law Schools**

Juris Doctor students may earn no more than a total of 6 credit hours from summer programs at other law schools toward their degree. Students planning to attend summer sessions at other law schools and intending to use the credit toward their Juris Doctor program at the Law Center must first have the courses they wish to take approved by the dean. Students may not take courses in summer sessions at other law schools in this vicinity if the same courses are being given during the summer session at the National Law Center. A student must earn a grade of *C* or better (under the grading system of the other law school) to transfer the credit hours with a grade of Credit to the Law Center; and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken at other law schools during the summer will count toward the total of 17 hours allowed under the Credit/No Credit option. Credit will not be recognized in excess of that which can be obtained in a similar period at the National Law Center. Students who register at another law school must provide the dean with an official transcript of their work there promptly on its completion.

### Joint Juris Doctor–Master's Degree Programs

The National Law Center offers joint degree programs with four other schools of the University. With the School of Medicine and Health Sciences, the J.D./M.P.H. (public health) is offered. Degrees offered with the School of Business and Public Management include the J.D./M.B.A. (business administration), J.D./M.P.A. (public administration), J.D./M.H.S.A. (health services management and policy), and J.D./M.U. & R.P. (urban planning and real estate development). Degrees offered with the Elliott School of International Affairs include the J.D./M.A. in the fields of international affairs; security policy studies; science, technology, and public policy; Russian and Eastern European studies; East Asian studies; and Latin American studies. With the Graduate School of Arts and Sciences, joint degree programs may be pursued in all fields leading to a master's degree.

Students must be admitted to both the National Law Center and, separately, to the school that will confer the master's degree. Each school must also independently approve a student's application to pursue a joint degree program. The Law Center will allow 12 credit hours of work completed in the master's program to count toward completion of the 84 credits required for the law degree, making it possible to complete both degrees within four years. A number of other rules govern the joint degree programs. Students interested in entering one of the programs should see the appropriate dean.



### Graduate Programs

The National Law Center offers advanced degree programs leading to the Master of Laws and Doctor of Juridical Science degrees for U.S. and foreign attorneys. The International Legal Studies LL.M. program is designed especially for graduates of foreign law schools who may pursue the degree in International and Comparative Law or in other fields. Both the LL.M. and S.J.D. programs offer an opportunity for attorneys to gain a more in-depth understanding of the law while engaging in scholarly research.

### The Master of Laws Degree

The Master of Laws candidate may follow a program of general study and design an individual program or may concentrate in one of the specialized areas listed below. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

- Environmental Law
- Government Contracts Law
- Intellectual Property Law
- International and Comparative Law
- Land Use Management and Control Law

### Entrance Requirements

For applicants with an American law degree, a Juris Doctor or equivalent degree is required from a law school that is a member of the Association of American Law Schools or is approved by the American Bar Association. The applicant must have demonstrated a high degree of academic excellence in earning the first law degree.



Foreign attorneys must have completed a law degree with high academic standing from a recognized foreign university. Foreign attorneys may also need to meet the minimum language test requirement (see below).

Advanced standing is not granted for credit earned while a candidate for the first law degree or for credit earned at any time before the student was a degree candidate in the LL.M. program at the National Law Center.

## Admission

### U.S. Attorneys

Application forms are available at and should be returned to the Admissions Office of the National Law Center, George Washington University, Washington, D.C. 20052.

Applications are due in the Admissions Office by June 1 for the fall semester, October 1 for the spring semester, and one month prior to the beginning of the summer session for which application is made.

### Foreign Attorneys

Foreign attorneys are admitted to the International Legal Studies program beginning in the fall semester only. Application forms are available at and should be returned to the International Legal Studies Program, National Law Center, George Washington University, Washington, D.C. 20052.

Applications are due in the International Legal Studies Program Office by May 1.

### Test of English as a Foreign Language (TOEFL)

Students from countries where English is not an official language are required to take the Test of English as a Foreign Language and attain a score in the 600-point range to be considered for admission at the National Law Center. This is a mandatory requirement. Students are responsible for making arrangements for taking the test and should address inquiries to TOEFL Educational Testing Service, Princeton, New Jersey 08541, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have the test score sent to three institutions. Registration for the Test of English as a Foreign Language does not constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test, lists of examination centers, examination dates, and an application blank. On the application for the test, the student should specify that the scores be sent to the International Legal Studies Program Office of the National Law Center.

## Degree Requirements

In order to earn the Master of Laws degree, all students must fulfill the following requirements: completion of 24 semester hours of credit including the required curriculum in the specialized programs (see Curriculum, below); attendance for a residence period of not less than two semesters, which should be consecutive; achievement of a cumulative grade point average of 75 (72 for foreign attorneys) at the time all requirements are met; completion and acceptance of a thesis (may be waived for foreign attorneys—see Thesis Waiver below); completion of all requirements at the National Law Center; and, for foreign attorneys only, completion of Law 922 (*Introduction to American Law*).

Full-time U.S. students must complete all degree requirements within two years from the date of admission; part-time students must complete all degree requirements within four years from the date of admission. U.S. students who wish to extend the period allowed for completion of degree requirements must petition

the Graduate Studies Board. Foreign students in the International Legal Studies Program are expected to complete all degree requirements in one academic year. An extension for one semester may be granted by the program director in exceptional circumstances.

### Curriculum

Candidates for the General LL.M. must complete 24 credit hours, including 4 hours of thesis, and should consult with the appropriate dean in order to design a comprehensive program of study. Students may choose to concentrate their studies in one or more areas, such as constitutional law, labor law, corporate law, and health care law.

Candidates for the degree in a specialized program must complete 24 credit hours, including 4 hours of thesis and the minimum required number of hours in courses listed below for each program. Related courses are recommended for the remaining coursework. Specialized degree candidates must have their programs of study approved by the program director.

### *Environmental Law Program*

*Director* A.W. Reitze, Jr

*Environmental Law Courses*—12 credits required

Land Development Law (408)	Natural Resources Law (546)
Air Pollution Control (411)	Water Pollution Control (547)
Clinical Studies in Environmental Law (414)	Control of Toxic and Hazardous Substances (RCRA & CERCLA) (548)
Occupational Safety and Health Legislation (415)	Energy Law (549)
Toxic Tort Litigation (455)	Use and Control of Nuclear Energy (550)
Water Resources Law (543)	International and Comparative Environmental Law (551)
Environmental Planning (544)	
Regulation of Chemicals (FIFRA & TSCA) (545)	

### *Courses Related to Environmental Law*

Mediation (303)	Medicine for Lawyers (470)
Complex Litigation (308)	Law, Science, and Technology Seminar (475)
Administrative Law (342)	Government Contracts (486)
Regulated Industries (345)	Government Procurement Law (487)
Planning, Zoning, and Land Use Law (402)	Practical Economics for Lawyers (500)
Current Problems in Land Use Management and Control Seminar (403)	Statistics and the Law (503)
Land Use Administrative Process (404)	International Law of the Sea (567)
Products Liability (454)	Legislative Drafting (591)

### *Government Contracts Program*

*Director* F.J. Lees; *Faculty Advisers* R. Nash, J. Cibinic

*Government Contracts Courses*—10 credits required

Comparative Public Procurement (485)	Government Contracts Seminar (490)
Government Contracts (486)	Government Contracts Cost & Pricing (491)
Government Procurement Law (487)	Clinical Studies in Government Contract Law (597)
Administration of Government Contracts (489)	



*Courses Related to Government Contracts*

- |  |   |
|--|---|
| Federal Jurisdiction (300)                                     | Employment Discrimination Claims and Litigation (432) |
| Negotiations: Concepts and Techniques (305)                    | International Business Transactions (446)             |
| Business Planning (334)  | Unfair Trade Practices (450)                          |
| Labor Law (338)  | Federal Antitrust Laws (452)                          |
| Collective Bargaining and Labor Arbitration (340)              | Trade Secret and Patent Law (464)                     |
| Environmental Law (410)  | Computer Law (468)                                    |
| Federal Income Taxation of Corporations and Shareholders (424) | Use and Control of Nuclear Energy (550)               |
| Labor Standards (429)  | Legislative Drafting (591)                            |
| Employment Discrimination Law (431)                            |   |

*Intellectual Property Law Program*

Director D.W. Banner

*Intellectual Property Law Courses—10 credits required*

- |   |  |
|---|--|
| Trade Secret and Patent Law (464)               | Enforcement of Patent Rights (556)               |
| PTO Practice in Patent Matters (466)            | Electronics and Computers: Patent Practice (557) |
| Licensing of Intellectual Property Rights (552) | Foreign and Comparative Patent Law (558)         |
| Chemical and Biotech Patent Practice (553)      | Copyright Law (559)                              |
| Patent Law Seminar (554)                        | Trademark Law (560)                              |
| Interference Law and Practice (555)             |  |

*Courses Related to Intellectual Property Law*

- Unfair Trade Practices (450)
- Federal Antitrust Laws (452)
- Trade Regulation Seminar (462)
- Computer Law (468)
- Government Procurement Law (487)

*International and Comparative Law Program*

Director T. Buergenthal; Associate Director R. Steinhardt; Faculty Advisers J.A. Spanogle, J. Alvarez

*International and Comparative Law Courses—12 credits required*

- |  |  |
|--|--|
| International Commercial Law (371)                               | Law of the European Communities (561)                    |
| Comparative Law (438)  | Law of Japan (562)                                       |
| Foreign Relations, National Security, and the Constitution (443) | International Law of Human Rights (565)                  |
| International Law (444)  | International Law of Air and Space (566)                 |
| International Business Transactions (446)                        | International Law of the Sea (567)                       |
| International Organizations (447)                                | International Humanitarian Law (568)                     |
| International Arbitration (448)                                  | Soviet Law (569)   |
| International Civil Litigation (449)                             | International Negotiations (571)                         |
| Public International Law Seminar (504)                           | Income Taxation of Foreign Business and Investment (583) |
| International and U.S. Regulation of Foreign Trade (505)         |  |

*Courses Related to International and Comparative Law*

Immigration Law (360)	Comparative Public Procurement (485)
Refugee and Asylum Law (361)	Use and Control of Nuclear Energy (550)
Admiralty (386)	Foreign and Comparative Patent Law (558)
International and Comparative Environmental Law (410)	
Conflict of Laws (440)	

*Land Use Management and Control Program*

Director J.M. Brown

*Land Use Management and Control Courses*—10 credits required

Planning, Zoning, and Land Use Law (402)	Law of Real Estate Financing (538)
Current Problems in Land Use Management and Control Seminar (403)	Survey of Mortgage Finance (539)
Land Development Law (408)	Water Resources Law (543)
Local Government Law (409)	Natural Resources Law (546)
Environmental Law (410)	Real Estate and Income Taxation (579)
	State and Local Taxation (581)

*Courses Related to Land Use Management and Control*

Securities Regulation (326)	Disabled People and the Law (482)
Public Law Seminar (344)	Government Procurement Law (487)
Legislation (362)	Public Economic Policy and the Law (501)
Remedies (380)	Environmental Planning (544)
Insurance (382)	Control of Toxic and Hazardous Substances (RCRA & CERCLA) (548)
Community Property/Marital Property (394)	Legislative Drafting (591)
Air Pollution Control (411)	
Clinical Studies in Environmental Law (414)	

*Thesis Requirement*

Each candidate for the LL.M. degree must write a master's thesis (Law 599-600) under the supervision of a full-time member of the faculty of the National Law Center. Four hours of credit toward the degree is given for successful completion of the thesis. The thesis is expected to be a scholarly paper of the same quality and length as a law review article.

The thesis in its final form must be presented to the adviser no later than the date specified in the Academic Calendar. When the thesis is accepted, three copies of the final thesis are required. It is the responsibility of the candidate to obtain from the assistant dean for graduate programs a printed copy of the regulations governing the style and reproduction of theses. The thesis binding fee must be paid at the time of registration for the last semester of work.

Students who are unable to finish the thesis during the semester in which they have registered for Law 600 must maintain continuous enrollment until the thesis has been completed (see Continuous Enrollment).

Accepted theses become the property of the University and are placed in the University's Gelman Library and the Jacob Burns Law Library, where duplicate copies are bound and made available for circulation.

The National Law Center encourages publication of LL.M. theses in appropriate scholarly journals with an acknowledgement that the thesis was submitted in partial fulfillment of the LL.M. degree at the The George Washington University.



### ***Thesis Waiver***

Foreign attorneys who are candidates for the LL.M. degree may request a waiver of the thesis requirement. A candidate for the degree in a specialized field must submit the request in writing to the director of the program in that field. A student in the general LL.M. program must submit the request to the director of the International Legal Studies Program. All requests for a thesis waiver must be submitted no later than the beginning of the final semester or summer session before the student's graduation. Approval of such a request will be granted only if the student has demonstrated research and writing ability by successfully completing a substantial research paper in a course or as an independent writing project.

### **Dual Field Designation**

Students may have more than one field of specialization noted on their diplomas if they fulfill the following requirements: complete the minimum number of course credits in each program area (see Curriculum); write the master's thesis on a topic that intersects both of the program areas; receive advance approval of the thesis topic from both program directors.

### **Joint LL.M./M.P.H. Degree**

Candidates for the LL.M. in Environmental Law may pursue a joint LL.M./M.P.H. degree. Admission must be obtained separately to the LL.M. program and to the Master of Public Health program in the GW School of Medicine and Health Sciences. To be admitted, applicants must have a strong legal background and substantial training in science. More information about the requirements for the joint degree program may be obtained from the admissions offices of each school.

### **Academic Regulations**

#### **Academic Work Load**

Master's candidates without substantial outside employment may take a maximum of 12 credit hours per semester. Students with more than 20 hours of outside employment must take a limited program of study not to exceed 8 credit hours. The minimum load is 4 credit hours unless approval for fewer hours is given by the dean.

#### **Academic Evaluation**

##### ***Grades***

Grades are given in numerical terms equivalent to letter grades as follows.

- 85-100 A, Excellent
- 75-84 B, Good
- 65-74 C, Poor
- 55-64 D, No credit toward the degree given to U.S. students
- 45-54 F, No credit given toward the degree

Graduate students may not elect to take graded courses on a Credit/No Credit basis. No credit is given for grades below 65 for U.S. attorneys in the program and for grades below 55 for foreign attorneys. A student who has been excused from taking a regularly scheduled examination is given the grade of I, Incomplete. A student who fails to take an examination and is not excused receives a grade of 45. See Examinations, below, for rules governing makeup examinations.

The cumulative average of a student includes all grades in all courses taken while a candidate for a given degree.

No grade may be changed by an instructor after it has been posted in the Law Center or disclosed to a student unless there has been an error in arithmetic that has been certified in writing by the instructor.

### **Honors**

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

### **Examinations**

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of 45 will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course has two options: The student may comply (prior to the completion of the semester following the excused absence) with the instructor's procedure of evaluation on a Credit/No Credit basis (for credit, a minimum grade of 75 is required for U.S. LL.M. candidates, 65 for foreign candidates) or the student may have the grade of *I* (Incomplete) entered on the record and take the next regularly scheduled examination for a numerical grade. Permission to take an examination before the regularly scheduled date will not be granted.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to next regular examination in the subject may petition the Graduate Studies Board, which may authorize such action as the circumstances require.

### **Research Papers**

The preparation of a research paper is required in lieu of an examination in seminars and other courses, as indicated in the course descriptions. To receive a numerical grade on a research paper, the paper must be submitted by the last day of classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester, if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When the deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course until a paper acceptable to the instructor has been submitted; (2) the only grade the student may receive for the course is *CR* (Credit) or *NC* (No Credit). To receive credit, a minimum grade of 75 is required for LL.M. candidates (65 for foreign candidates). Failure ultimately to submit any paper for the course will result in a grade of 45.

### **Changes in Program of Study**

Master of Laws candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may not add courses and may drop courses only with the approval of the instructor and the dean. Under no circumstances may a student drop a course after the last day of classes in any semester.

### **Credit for Courses Taken in Other Departments**

Master of Laws candidates may be permitted to take graduate courses related to their fields of interest in other departments of this University. A maximum of 6 semester hours will be credited toward the degree for such courses. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses; a student must earn a grade of at least *B* to receive a Credit.



### **Consortium of Universities of the Washington Metropolitan Area, Inc.**

A candidate for the Master of Laws degree may take graduate courses at Georgetown University Law Center through the Consortium of Universities of the Washington Metropolitan Area. A maximum of 6 semester hours of such courses may be credited toward the master's degree. Permission to take Consortium courses must be granted by the dean, the registrar, and the instructor offering the course. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses. To receive the grade of *CR* a student must attain a grade of *C* or higher.

### **Continuous Enrollment**

Degree candidates are expected to maintain continuous enrollment until all degree requirements are satisfied. Students who have previously enrolled in Law 599-600, *Thesis*, and have not completed their thesis must continue to be enrolled each semester up to and including the semester of their graduation. A student who fails to register for one semester or more is dropped from the University's registration rolls and must apply to the law school for readmission.

### **Readmission**

A student who fails to register for one or more semesters will be required to apply for readmission in order to continue in the degree program. Application for readmission should be made to the Graduates Studies Board. Readmitted students will not receive academic credit for coursework completed more than five years prior to the date of the readmission request. Petitions for exceptions to this policy should be addressed to the Graduate Studies Board and will be granted only in exceptional circumstances.

### **Attendance**

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

### **The Doctor of Juridical Science Degree**

Programs leading to the degree of Doctor of Juridical Science offer a very small number of unusually talented students, who have already earned the Master of Laws degree, the opportunity to concentrate on research and writing in a specific area of interest.

### **Entrance Requirements**

#### **U.S. Attorneys**

Admission to the Doctor of Juridical Science degree program requires a Bachelor of Arts or equivalent degree from an approved college or university; a Juris Doctor or equivalent degree, earned with high rank, from a law school that is a member of the Association of American Law Schools (AALS) or is approved by the American Bar Association (ABA); a Master of Laws degree with high academic standing, outstanding capacity for scholarly work in the field of law, and faculty approval of the applicant's dissertation topic. Applicants must demonstrate their writing ability by submitting the master's thesis or a copy of one or more papers or articles that the applicant has written. Following consultation with the dean, the applicant must obtain a faculty adviser, to be designated committee chairman, from the regular, full-time faculty; reach agreement on the acceptability of the proposed topic for the dissertation; and submit a detailed outline for the adviser's approval, indicating by chapter and division within chapter the exact scope of the project. There should be

a bibliography for each chapter, listing books, reports, cases, and law review articles to be considered. Although the outline cannot predict every detail of the subsequent research, it must be sufficiently definite to afford the Graduate Studies Board a basis for evaluation.

Once the outline is approved, the applicant's committee is expanded to three members; this consultative committee must recommend the acceptance of the applicant to the full Graduate Studies Board. The Board then acts upon the recommendation and may either accept or reject the applicant as an S.J.D. candidate. In no instance will any applicant be admitted to degree candidacy prior to the above procedures; however, the applicant may be registered as an unclassified student for purposes of completing the 8 semester hours of course work requirements (see below). Approval for degree candidacy must be received within one year of the appointment of an adviser unless a written extension is granted by the dean.

### Foreign Attorneys

To be considered for admission to the Doctor of Juridical Science degree program, individuals who received their first law degree outside the United States must have obtained an LL.M. or its equivalent with highest honors from a duly accredited (ABA or AALS) American law school and their first law degree with comparable honors.

Admission to the S.J.D. program will be limited to a very small number of the most qualified applicants whose research proposals are determined to be of special interest to one or more members of the regular, full-time faculty. Applicants must, therefore, submit with their application a letter outlining their S.J.D. research plans.

### Degree Requirements

Candidates for the Doctor of Juridical Science degree must complete the following requirements in order to be awarded the degree: A residence period of not less than one academic year, a course of study and research, designated by the dissertation committee, of no less than 8 credit hours, and completion and acceptance of a dissertation (see below).

### The Dissertation

The dissertation must be submitted no later than three years from the date of admission to candidacy for the S.J.D. degree. The applicant who proposes to write on a comparative law topic must have a reading knowledge of the language in which the relevant materials are to be found. When the dissertation is submitted, the consultative committee will set the date for oral examination. This examination is conducted by the consultative committee and such other members of the faculty and qualified experts as are selected by the Graduate Studies Board.

No later than the date specified in the Academic Calendar, the candidate must submit to the dean two complete copies of the dissertation and two copies of an abstract of the dissertation.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation and preparation of the abstract are available in the Office of the Dean. To be acceptable, the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the dean. Accepted dissertations become the property of the University and are placed in the University's Gelman Library and the Jacob Burns Law Library, where duplicate copies are bound and made available for circulation.



## Fees and Financial Regulations

The following fees and financial regulations were adopted for the 1991 summer sessions and the 1991-92 academic year

### Tuition Fees

J.D. candidates:

Full-time program (11 or more credit hours), each semester	\$8,225
Part-time program, each credit hour	588
Master's degree candidates, each credit hour	588
Continuing Legal Education students, each credit hour	588
S.J.D. candidates,* full program, including the final examination	16,450

**Marvin Center Fee** (charged all students registered on campus)

\$12.60 per credit hour, to a maximum of \$126 per semester

**Registration Fee** (nonrefundable, charged all students per semester and summer registered)

Registration prior to the beginning of the semester	25
Registration during the first week of the semester	75
Registration after the first week of the semester	125

### Special Fees

Application fee (degree candidate), nonrefundable	55
Tuition deposit fee charged each student admitted to J.D. degree candidacy (payable in two installments—\$100, nonrefundable, by a date specified in the letter of admission; \$500, nonrefundable, by mid-June)	600
Graduation fee (charged all students applying for graduation)	78
Fee for binding master's theses and S.J.D. dissertations	30
Late payment fee, (see Payment of Fees, below)	50
Replacement of lost or stolen picture identification card	25
Returned check fee, charged a student whose check is returned because of insufficient funds or for any other reason	15
Transcript fee	3
Replacement of diploma fee	50

Registration on campus in the University entitles each student to the following privileges: the services of the Career and Cooperative Education Center; the use of the University library, gymnasium privileges, and admission to all athletic contests, unless otherwise specified. These privileges terminate and a student is no longer in residence upon withdrawal or dismissal from the University.

### Payment of Fees

When the student registers for courses to be taken in the forthcoming semester, a schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. Students registered for 6 semester hours or more may sign a deferred payment contract with

\*The tuition fee is to be paid at the rate of \$4,112.50 per semester for four successive semesters, one of the summer term or terms. If the Faculty should approve an extension of time, the student must maintain enrollment.

the Student Accounts Office at the time of each registration, permitting them to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by \$2,600 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment plan.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

### Prepaid and Deferred Payment Plans

Several commercial programs are available for those who wish to pay the costs of their education on a monthly basis. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

Mellon Bank Edu-Check Plan, P.O. Box 8888, Wilmington, Del. 19899

Richard C. Knight Insured Tuition Plan, 53 Beacon Street, Boston, Mass. 02108

School-Chex, Irving Trust Company, 61 Broadway, New York, N.Y. 10007

Educational Loan Program, The Riggs National Bank, 1913 Massachusetts Ave., N.W., Washington, D.C. 20035

The Tuition Plan, Inc., Concord, N.H. 03301

Tuition Line, Maryland National Bank, Consumer Banking Division, P.O. Box 1954, Baltimore, Md. 21203

### Withdrawals and Refunds\*

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

\* The \$600 deposit required of entering students is nonrefundable.



1. *Complete withdrawal from the University:*
  - Withdrawal dated on or before the end of the first week of the semester ..... 80%
  - Withdrawal dated on or before the end of the second week of the semester ..... 60%
  - Withdrawal dated on or before the end of the third week of the semester ..... 40%
  - Withdrawal dated on or before the end of the fourth week of the semester ..... 25%
  - Withdrawal dated after the fourth week of classes ..... None
2. *Partial withdrawal:* If the change in program results in a lower charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education.

In no case will tuition be refunded or reduced because of absence from classes. Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Please note that effective January 1993, the University will initiate a student health fee of \$100.

## Financial Aid

The National Law Center assists many students in obtaining financial aid through grants, various loan programs, or a combination of these kinds of assistance.

## Juris Doctor Program

The National Law Center participates in the Graduate and Professional School Financial Aid Service (GAPSEAS), which provides an analysis of an applicant's financial need. Entering students wishing to receive financial aid should file the GAPSEAS form after January 1. Forms are available at most university financial aid offices. The information provided by the applicant and the applicant's parents will be analyzed and a copy of the report will be sent to the Law Center.

Students seeking financial assistance should file with GAPSEAS in time for their reports to be received at the Law Center as early as possible. University funds will be awarded on the basis of financial need. In determining financial need, the Financial Aid Office considers information provided by GAPSEAS and Federal tax returns. The Committee on Student Financial Aid of the Law Center will begin making awards in March, and available funds are limited.

No awards will be made to an entering student until the admission process has been completed.

## Sources of Financial Aid

Financial aid has been made available from many friends and alumni of the Law Center. The scholarships include the following.

Arent, Fox, Kintner, Plotkin & Kahn  
Scholarship  
Mildred Gott Bryan Scholarship  
Jacob Burns Honor Scholarship  
Charles Worthington Dorsey  
Memorial Scholarship  
Samuel Green Phi Delta Phi  
Scholarship  
Patricia Roberts Harris Scholarship  
Howrey and Simon Scholarship  
Hunton and Williams Scholarship  
Thomas Searing Jackson Scholarship

Jacob and Charlotte Lehrman  
Foundation Scholarship  
Manatt-Phelps Banking Law Scholarship  
Robert Netherland Miller Scholarship  
Phi Delta Delta Scholarship  
Donald C. Snyder Scholarship  
William Pinckney Walker Memorial  
Scholarship  
Frank S. Whitcomb Scholarship  
Glen A. Wilkinson Scholarship  
J. McDonald and Judith K. Williams  
Scholarship

## Loan Funds

Through the generosity of friends of the University, a number of loan funds are available. Among them are the Lyle T. Alverson Loan Fund; the Robert Ash Loan Fund; the George R. Beneman Loan Fund; the Morris and Gwendolyn Cairitz Foundation Minority Law Student Loan Fund; the Robert M. and Mary McConnell Cooper Loan Fund; the Robert McKinney Cooper Memorial Loan Fund; the Mitchell S. Cutler Memorial Loan Fund; the J. Forrester Davison Loan Fund; the Clifford A. Dougherty Fund; the District of Columbia Bar Association Loan Fund; the Louise F. Ehrlich Foundation Loan Fund; the Newell W. Ellison Loan Fund; the Louise F. Freeman Memorial Student Loan Fund; the Harold L. and Violet George Foundation Loan Fund; the George Washington Law Association Loan Fund; the Morris Golub Loan Fund; the Frederick O. Graves Law Student Loan Fund; the John B. Jr. and Carol H. Holden Loan Fund; the Jephson Educational Trust Loan Fund; the Susan and Anne Kondrup Memorial Fund; the Law Association Loan Fund for the law classes of 1912, 1918, 1921, 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939, 1941, 1942, 1945, 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1963, 1964, 1965, the Law School Loan Fund; the Oscar Lawler Memorial Loan Fund; the Horace L. Lohnes



Memorial Assistance Fund, the Jessie B. Martin Loan Fund; the Robert N. Miller Loan Fund; the Joan Murphy Loan Fund; the Mike Pelekiri Loan Fund; the Phi Delta Delta Loan Fund; the W. Theodore Pierson Loan Fund; the Rockport Loan Fund; the Samuel L. Samuel Loan Fund; the H. William Tanaka Law Students Assistance Loan Fund; the Orville Hassler Walburn Memorial Loan Fund; the Kennedy and Judith Watkins Law Student Loan Fund; the Ralph E. West Memorial Loan Fund; the W.H. Williams Memorial Student Loan Fund; the Patricia A. Willoner Loan Fund; the Ruth F. Wilson Loan Fund; the Yadao and Kanemoto Loan Fund; and the Samuel Green Memorial Loan Fund.

### Master's and Doctoral Programs

Sources of financial aid include the Richard Paul Momsen Scholarships for Brazilian Graduate Law Students for the study of U.S. constitutional law and the law of patents and trademarks, the Randolph C. Shaw Graduate Fellowship in Environmental Law, the Randolph C. Shaw Fellowship in Legal Research and Writing, and Graduate Honor Fellowships.

Application for these programs should be made by March 1. The applicant should submit a letter specifically applying for one of the above programs to the Financial Aid Office. The letter should contain biographical data, information concerning experience in practice or teaching, and any other information that will be of assistance in the consideration of the application.

Students applying for financial aid on the basis of financial need should follow the same guidelines outlined for Juris Doctor candidates.

### Veterans Benefits

The veterans counselor, located on the third floor of Rice Hall, 2121 I Street, N.W., assists students entitled to educational benefits as veterans or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or dependents of veterans should consult with the veterans counselor prior to submitting an application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and which includes other information of general interest. The Veterans Administration is at 941 N. Capitol St., N.E., Washington, D.C. 20421.

## Prizes

*Bureau of National Affairs Law Student Prize*—Presented to an outstanding senior law student.

*Jacob Burns Prize*—Established by Jacob Burns, a law alumnus and Honorary Trustee of the University. A medal and a cash award presented annually to each of the two members of the winning team in the upper-class Van Vleck Moot Court competition.

*The Michael D. Cooley Memorial Prize*—A plaque given to that individual in each graduating class who has been most successful in maintaining his or her compassion, vitality, and humanity during law school. The recipient of this award is selected by the graduating class.

*Ogden W. Fields Graduate Prize*—Awarded annually to the graduate student who has demonstrated the highest overall proficiency in labor law.

*Finnegan Prize in Intellectual Property Law*—Established by the law firm Finnegan, Henderson, Farabow, Garrett, and Dunner. A cash award to a J.D. or LL.M. student for the best publishable article on an aspect of intellectual property law.

*Willard Waddington Gatchell Prize*—By bequest of Eona Burnett Gatchell in memory of her husband, a cash award presented annually to the three members of the graduating Juris Doctor class who attained the highest grade point averages in their last year of law school.

*Charles Glover Prize*—Established by Charles Carroll Glover, Jr., an Honorary Trustee of the University, in memory of his great-grandfather, an illustrious member of the bar of the District of Columbia. A cash award given annually to the student who has attained the highest average grade in the third-year, full-time course.

*Kappa Beta Pi Prize*—Awarded by Eta Alumnae Chapter to the law student who attains the highest average for the first year.

*John Bell Larnier Prize*—By bequest, a plaque awarded annually to the member of the graduating class who attains the highest average grade in the entire course of the degree of Juris Doctor.

*John Ordronaux Prizes*—By bequest, awarded annually to the student who has attained the highest average grade in the first-year, full-time course and to the student who has attained the highest cumulative average grade at the end of the second-year, full-time course.

*Richard L. Teberg, J.D. 1964, Prize*—Awarded annually to that graduate of the J.D. program who has demonstrated the highest overall proficiency in the courses in securities law.

*Jennie Hassler Walburn Prize*—A cash award to the outstanding students in the field of civil procedure, established by the will of the late Professor Orville Hassler Walburn in memory of his mother.

*Imogen Williford Constitutional Law Prize*—Established by Imogen Williford, J.D. 1929. A cash award presented to the outstanding student in the field of constitutional law.



## General Information

### Day and Evening Classes

Day classes meet in 50 minute periods, Monday through Friday. The majority of evening classes meet from 5:50 to 7:40 p.m., Monday through Friday.

A four-credit course, e.g., *Evidence*, meets two evenings a week; most 3-credit courses, e.g., *Administrative Law*, meet one evening a week plus alternate Friday evenings throughout the semester; a 2-credit course, e.g., *Contracts II*, meets one evening a week. The evening division conforms to the academic standards of the day division, with full-time faculty teaching all courses in the required and core curriculum.

Examinations for both day and evening classes may be given in the afternoon. Examinations for day students may be given in the evening.

### Summer Session

One session is offered in the summer. No beginning students are admitted to the Juris Doctor degree program in the summer session.

The summer session is shorter than a semester of the academic year, and, as a consequence, residence is calculated on a proportional basis, depending on the number of hours taken.

### Registration

Each student must register before attending classes. No student will be registered until proper credentials have been filed (see Admission).

No registration is accepted for less than a semester or summer session. A student may not register concurrently in George Washington University and another institution. Registration in more than one school of the University requires the written permission of the deans concerned, prior to registration.

### Eligibility for Registration

A student who is suspended or whose record is not clear for any reason is not eligible to register.

**New Student**—Upon receipt of a final letter of admission a new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered who was not registered for courses during the preceding semester or summer session and who has not been granted a leave of absence must apply for and receive a letter of readmission before becoming eligible for registration.

### Graduation Requirements

Diplomas are awarded in February, May, and September.

To be recommended by the faculty for graduation, a student must have met the admission requirements of the National Law Center, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which the student is registered, and be free from all indebtedness to the University. Registration is required for the semester or summer session at the close of which the degree is to be conferred.

**Application for Graduation**—An application for graduation must be filed by the date indicated in the Academic Calendar during the last semester or summer session of the final year. Students completing degree requirements during the summer session will be awarded diplomas (no formal convocation) on September 30, provided they have completed all degree requirements and have applied for graduation as part of registration for the summer session. If they wish, such students may participate in the Winter Convocation.

## Transcripts of Record

Official transcripts of student records will be issued by the Office of the Registrar on request of the student or former student who has a clear financial record. A fee of \$3 is charged for each transcript.

## Student Activities and Student Life

### Enrichment Program

The Law Center supplements and enriches its diverse law programs by bringing to the school eminent legal scholars, judges, distinguished members of the bar, members of Congress, and high-level government officials to offer lectures and informal seminars with students and faculty. Participants in the Enrichment Program have included columnist Anthony Lewis, Supreme Court Justices Lewis Powell, Antonin Scalia, Sandra Day O'Connor, Anthony Kennedy, and Harry Blackmun, CIA Director William Webster, Yale University President Benno Schmidt, Senator Bill Bradley, former U.S. Attorney Rudolph Giuliani, Dean Guido Calabresi of Yale Law School, Judge Richard Posner of the U.S. Court of Appeals for the Seventh Circuit, and Professor Ronald Dworkin of Oxford University. The Enrichment Program, funded largely by gifts from alumni and friends of the Law Center, includes several endowed lectureships and a visiting scholar program.

### Publications

The *George Washington Law Review*, published five times a year, is edited and managed by the students of the National Law Center. The *Law Review* is known for its emphasis on federal and public law; however, it is also devoted to research in other important legal areas. The staff of the *Law Review* is selected on the basis of grades and a writing competition. The editorial board is selected from those students who have successfully completed the first year of *Law Review* work. Students receive 4 semester hours of academic credit for the two-year program.

The *George Washington Journal of International Law and Economics* is managed and edited by law students. It presents articles and commentaries on public and private international financial development, comparative law, and international law. The staff of the *Journal* is selected on the basis of criteria identical to those used by the *Law Review*, and students earn up to four semester hours of academic credit for their work.

### Moot Court

The moot court competitions and programs provide realistic training in appellate and trial advocacy. The Moot Court Board, which administers appellate moot court programs at the National Law Center, is a student organization dedicated to promoting excellence in written and oral advocacy. The Board sponsors the Van Vleck Appellate Moot Court Competition, the Jessup Cup competition in international law, and the Giles S. Rich competition in patent law. In addition, the Board sends student teams to interscholastic competitions across the nation. The Student Trial Lawyers Association sponsors an intrascholastic trial competition and sends student teams to interscholastic trial competitions nationwide.



## Law Center Student Organizations

### *The Advocate*

Amnesty International Legal Support Group

Asian-Pacific American Law Student Association

Black Law Student Association

Entertainment and Sports Law Society

Environmental Law Association

Equal Justice Foundation

Federalist Society

Gay and Lesbian Law Association

GW Republican Student Lawyers Association

International Law Society

International Legal Studies Student Association

Jewish Law Student Association

Law Association for Women

Law Fraternities and Sororities

Moot Court Board

Movimiento Legal Latino

National Lawyers Guild

Student Bar Association

Student Health Law Association

Student Intellectual Property Law Association

Student Trial Lawyers Association



## Facilities and Services

### The National Law Center

The Law Center is comprised of three adjoining buildings: Theodore N. Lerner Hall, Stockton Hall, and the Jacob Burns Law Library. Lerner Hall is a modern and innovative teaching facility. Its five levels contain classrooms, the dean's suite, and the Moot Court Room. Four of its eight classrooms are constructed in amphitheater style and are equipped with advanced sound systems and full video and viewing capabilities. Stockton Hall contains administrative offices, the Community Legal Services classrooms, faculty offices, a reading room, a media center, and a student lounge. The Jacob Burns Law Library houses faculty and student organization offices and a computer room as well as its extensive collection.

### The Jacob Burns Law Library

The use of a law library is inherently different from the uses of most other libraries. A law library is often likened to the scientist's laboratory. Most law books are used heavily on the premises rather than checked out for thorough reading. Law students spend many of their waking hours in the library, using books or other research facilities. Care has therefore been taken in making the Jacob Burns Law Library not only efficient but beautiful and comfortable.

The collection numbers over 400,000 volumes and volume equivalents. It contains a comprehensive research library of Anglo-American law, including the annotated statutes of the federal government, the 50 states, the territories, and other nations and often in multiple copies. The library is especially strong in administrative and regulatory material and congressional coverage. It was designated a United States Government Depository Library in 1978 and is, through this program, acquiring a substantial government documents collection. The extensive treatise collection covers not only the field of law but law-related disciplines such as business, finance, economics, labor relations, sociology, crimi-

nology, psychology, political science, biography, foreign affairs, environmental studies, and others. Especially strong collections are maintained for tax law, labor law, intellectual property law, and international law. A portion of the holdings of the former Library of the Carnegie Endowment of International Peace, acquired by the University in 1950, has been incorporated into the library. Another especially rich component is the periodical collection. A growing proportion of these research materials is collected in a variety of microformats or on audio- or videotapes. In addition to the materials available in-house, the library can gain access to almost unlimited information sources of a legal or law-related nature through the various computer databanks to which it subscribes, such as LEXIS, WESTLAW, Dialog, Nexis, and VU/TEXT.

A permanent staff of 27 persons and many part-time employees administers and maintains the library and offers information, instruction, and other research support services. *Jacob Burns Law Library Readers' Guide*, available at the information desk, lists library services, hours of operation, collection locations, and other library-related information.

Beyond the resources of the Jacob Burns Law Library, GW law students have access to the George Washington University Library (Gelman), the Medical Library (Himmelfarb), and other famous libraries in the District of Columbia, including the Library of Congress.

### **Career Development and Placement Services**

The Career Development Office provides a full range of services to support the career decision-making process. Students, graduates, and prospective employers are served through a variety of programs, including systems of job-vacancy advertising, newsletters of current career information, individual and group counseling on resume preparation, interviewing skills development, and job search strategy, a career resource library, and forums and panel presentations covering legal career topics as well as employment options.

### **Continuing Legal Education**

Members of the Bar who wish to keep abreast of current developments in the law may register for any of the courses in the National Law Center on a noncredit basis as Continuing Legal Education students. Specific courses are also open to non-lawyers whose special qualifications justify their registration. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)

### **Housing**

The University does not provide regular residence hall space for graduate students. However, the Housing and Residence Life Office refers graduate students to apartments as they become available in University-owned buildings in the campus area. Additionally, the University's Off-Campus Housing Resource Center can provide information and assistance for those seeking accommodations.

### **Food Service**

Contract food service is available from August to May, based on the undergraduate academic calendar of registration, exams, and vacation periods. Accommodations for the law school calendar are made. Rates for the various meal plans are available



from the Housing and Residence Life Office. Contract service is cafeteria style and provided in two residence halls and the Cloyd Heck Marvin Center. Meal coupons may also be used on a cash-equivalency basis in the cafeteria on the first floor of the Marvin Center and in George's on the fifth floor.

### **The Cloyd Heck Marvin Center**

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board, the departments offering course work in the performing arts, and other student and faculty organizations. The Center Governing Board, representing varied segments of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies that provide a framework for the Center's operation.

### **The Charles E. Smith Center**

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; jogging track; a swimming pool; wrestling, gymnastic, and weight rooms; handball and squash courts; and a sauna and lockers.

### **Student Health Service**

The Student Health Service is an outpatient clinic located at 2150 Pennsylvania Avenue, N.W. (entrance on 22nd Street).

The Health Service is staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be either arranged by appointment or, during certain hours, secured on a walk-in basis. Most routine laboratory tests may be performed in the Health Service lab at cost, many common medications are stocked to fill students' prescriptions, and allergy shots and immunizations are administered by the staff nurse for a minimal charge. A psychiatrist works in the Health Service to assist students with mental health concerns.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Legal Education Program are not eligible. Students who so desire may engage physicians and nurses of their own choice, but these students will be responsible for all fees charged. The bills incurred from all services rendered outside the Student Health Service (for example, x-ray work, laboratory work, and referrals to specialists or other outside physicians) are the responsibility of the student.

### **Health and Accident Insurance**

The University has arranged for and endorsed group health and accident insurance, on an elective basis, for those students who do not have other coverage. Interested students should contact the Student Health Service or Office of the Dean of Students.

### Disabled Student Services

The Director of Disabled Student Services coordinates advising, orientation, and special services that address the needs of disabled students. The Director also serves as a central point of contact from which the University community may obtain information and assistance in serving disabled students. A resource library maintained in the office is available for general use.

In addition to coordinating a program of general assistance to promote integration of disabled students as fully as possible into the life of the University community, the Director administers reading and sign language services for those with visual and auditory handicaps.

The office is located on the fourth floor of Rice Hall, 2121 I Street, N.W.



### University Regulations

#### University Policy on Equal Opportunity

George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to educational programs and employment. The University is also subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

#### Academic Dishonesty

The University community, to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

#### University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:



1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency; and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance, school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height and weight of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

### **Right to Change Rules**

The University and its college, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

### **Right to Dismiss Students**

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University document, the student's registration may be canceled and the student will be ineligible (except by special action of the faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes whenever, in the interest of the student or the University, the University Administration deems it advisable.

### **Right to Make Changes in Programs**

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

### **Property Responsibility**

The University is not responsible for the loss of personal property. A Lost and Found office is maintained on campus in the Safety and Security Office.

### **Student Conduct**

All students upon enrolling and while attending The George Washington University are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained at the Office of Judicial Affairs. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make

enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### **University Policy on Drugs**

The University cannot condone violations of the law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.



## Courses of Instruction

### Career Planning and Course Selection

One of the great strengths of the National Law Center is the diversity of its course offerings and the flexibility it offers students to design their programs to fit their interests and career plans. Every spring a series of counseling sessions is held to provide students with an overview of course offerings in various areas of the law and to assist them in selecting courses and defining their career objectives. Students also may consult members of the faculty for course and career planning. In addition, the Career Development Office provides a central storehouse of information regarding many types of legal careers.

While the curriculum after the first year is largely elective, the faculty believes that exposure to certain course work is important. Consequently, the faculty strongly recommends that all students take *Administrative Law* (342), *Corporations* (325), *Federal Income Taxation* (420), and *Trusts and Estates I* (390).

The faculty also believes that a generalist J.D. program would normally include most of the following courses and recommends that students take most of them prior to graduation: *Conflict of Laws* (440), *Federal Antitrust Law* (452), *Labor Law* (338), *Remedies* (380), and one or more of the following: *Commercial Paper, Check Collection, and Banking* (372), *Creditors' and Debtors' Rights* (378), and *Sales and Sales Financing* (370). In addition, the faculty believes that students should consider taking a course that will provide a cross-disciplinary perspective on the law, such as *American Legal History* (318), *Comparative Law* (438), *Jurisprudence* (492), and *Law, Science, and Technology* (475).

The Law Center's broad offering of elective courses is listed below by subject area. Within each area, courses are in numerical order. Courses numbered 500 and above are generally more advanced but are open to second- and third-year students who have taken the prerequisite courses. Students may wish to consult with faculty about the order in which courses should be taken.

The courses of instruction listed below are subject to change. The University reserves the right to withdraw any course announced.

### Elective Courses and Seminars

Courses marked with an asterisk are not offered during academic year 1991-1992.

#### Alternative Dispute Resolution

Mediation (303)  
Negotiation: Concepts and Techniques (305)  
Advanced Oral Advocacy (313)  
International Arbitration (448)  
International Negotiations (571)\*

Administrative Advocacy Clinic (493)  
Immigration Clinic (494)  
Law Students in Court (495)  
Law Students Civil Rights Research Council (496)  
Civil Litigation Clinic (497)  
Legal Activism (498)\*  
Federal and Appellate Clinic (499)  
Graduate Outside Placement (596)

#### Clinical Programs

Clinical Studies in Environmental Law (414)  
Consumer Mediation Clinic (460)  
Small Business Clinic (461)  
Outside Placement (463)  
Prisoners Project (476)  
National Center for Law and the Deaf  
Clinical Education Activities (483)\*  
Intensive Clinical Placement (492)

#### Commercial and Banking Law

Banking Law I (332)  
Banking Law II (333)  
Sales and Sales Financing (370)  
International Commercial Law (371)\*  
Commercial Paper, Check Collection, and Banking (372)  
Creditors and Debtors' Rights (378)

International Business Transactions (446)

International Banking (575)

***Constitutional Law, Civil Rights, and Government***

Federal Jurisdiction (300)

Administrative Law (342)

Public Law Seminar (344)\*

Constitutional Law Seminar (350)

Mass Communications Law—Print Media (352)

Mass Communications Law—Electronic Media (353)

Individual Rights and Liberties (358)\*

Civil Rights Legislation (359)

Legislation (362)

Local Government (409)

Employment Discrimination Law (431)

Employment Discrimination Claims and Litigation (432)

Foreign Relations, National Security, and the Constitution (443)

Law of Privacy Seminar (469)

Law, Science, and Technology Seminar (475)

Disabled People and the Law (482)\*

Gender Discrimination and the Law (484)

Legislative Drafting (591)

***Corporate and Securities Law***

Agency and Partnership (322)

Law and Accounting (324)

Corporations (325)

Securities Regulation (326)

Takeovers and Tender Offers (327)

Regulation of Securities Markets and Professionals (328)\*

Corporate Finance (329)

Business Planning (334)

The Modern Corporation Seminar (336)

Advanced Corporations and Securities Seminar (337)\*

Insurance (382)

Regulation of Investment Advisers and Investment Companies (507)\*

***Criminal Law and Procedure***

Law and Psychiatry Seminar (437)\*

Federal Sentencing Seminar (477)

Law and Criminology (478)

Law of Criminal Corrections (479)

The Crime Lab, the Forensic Scientist, and the Criminal Lawyer (532)

Criminal Practice Seminar (534)\*

***Environmental Law***

Environmental Law (410)

Air Pollution Control (411)

Clinical Studies in Environmental Law (414)

Occupational Safety and Health Legislation (415)\*

Toxic Tort Litigation (455)

Law, Science, and Technology Seminar (475)

Water Resources Law (543)

Environmental Planning (544)

Regulation of Chemicals (FIFRA & TSCA) (545)

Natural Resources Law (546)

Water Pollution Control (547)

Control of Toxic and Hazardous Substances (RCRA & CERCLA) (548)

Energy Law (549)

Use and Control of Nuclear Energy (550)

International and Comparative Environmental Law (551)

Natural Resource Taxation (580)\*

***Estate Planning***

Trusts and Estates I (390)

Trusts and Estates II (391)

Community Property Marital Property (394)

Estate Planning Seminar (395)\*

Federal Estate and Gift Taxation (422)

Federal Income Taxation of Trusts, Estates, and Beneficiaries (585)\*

***Family Law***

Trusts and Estates I (390)

Community Property/Marital Property (394)

Domestic Relations (434)

The Child, the Family, and the State (436)

Gender Discrimination and the Law (484)

***Government Contracts***

Labor Standards (429)

Comparative Public Procurement (485)

Government Contracts (486)\*

Government Procurement Law (487)



Performance of Government Contracts (488)

Administration of Government Contracts (489)\*

Government Contracts Seminar (490)

Government Contracts Cost & Pricing (491)

Clinical Studies in Government Contract Law (597)

### **Government Regulation**

Administrative Law (342)

Regulated Industries (345)

Mass Communications Law—

Electronic Media (353)

Fair Trade Practices (450)

Federal Antitrust Law (452)

Trade Regulation Seminar (462)\*

Public Economic Policy and the Law (501)

International and U.S. Regulation of Foreign Trade (505)

Health Care Delivery Systems Seminar (508)

Food and Drug Law (509)

Telecommunications Law (572)

### **Intellectual Property Law**

Fair Trade Practices (450)

Trade Secret and Patent Law (464)

Patent Practice in Patent Matters (466)

Computer Law (468)

Securing of Intellectual Property

Rights (552)\*

Chemical and Biotech Patent Practice (553)\*

Patent Law Seminar (554)

Interference Law and Practice (555)\*

Enforcement of Patent Rights (556)\*

Electronics and Computers Patent Practice (557)\*

International and Comparative Patent Law (558)

Copyright Law (559)

Trademark Law (560)

### **International and Comparative Law**

Immigration Law (360)

Refugee and Asylum Law (361)

International Commercial Law (371)\*

Arbitration (386)

Comparative Law (438)

Foreign Relations National Security and the Constitution (443)

International Law (444)

International Business Transactions (446)

International Organizations (447)\*

International Arbitration (448)

International Civil Litigation (449)

Public International Law Seminar (504)

International and U.S. Regulation of Foreign Trade (505)

International Business Transactions Seminar (506)\*

International and Comparative Environmental Law (551)

Foreign and Comparative Patent Law (558)

Law of the European Communities (561)

Law of Japan (562)\*

International Law of Human Rights (565)

International Law of Air and Space (566)

International Law of the Sea (567)

International Humanitarian Law (568)

Soviet Law (569)\*

Chinese Law (570)

International Negotiations (571)\*

International Banking (575)

Federal Income Taxation of Foreign Business and Investment (583)

### **Jurisprudence, Legal History, and Professional Responsibility**

American Legal History (318)

Jurisprudence (442)

Professional Responsibility and Ethics Seminar (450)\*

Jurisprudence Seminar (457)

Law, Science, and Technology Seminar (475)

### **Labor Law**

Labor Law (338)

Individual Employment Rights (339)

Collective Bargaining and Labor Arbitration (340)

Labor and Employment Law Seminar (341)\*

Sports Law (383)

Occupational Safety and Health Legislation (415)\*

Labor Standards (429)

Labor Relations in the Federal Service (430)

Employment Discrimination Law (431)

Employment Discrimination Claims and Litigation (432)

***Land Use and Development***

- Modern Real Estate Transactions (398)
- Planning, Zoning, and Land Use Law (402)
- Current Problems in Land Use Management and Control Seminar (403)
- Land Use Administrative Process (404)
- Land Development Law (408)
- Local Government Law (409)
- Law of Real Estate Financing (538)
- Survey of Mortgage Finance (539)

***Law and Other Disciplines***

- Law and Psychiatry Seminar (437)\*
- Medicine for Lawyers (470)\*
- Law and Medicine (472)
- Drugs and the Law Seminar (474)
- Law, Science, and Technology Seminar (475)
- Law and Criminology (478)
- Public Economic Policy and the Law (501)
- Law and Economics (502)\*
- Health Care Delivery Systems Seminar (508)

***Litigation and The Judicial Process***

- Federal Trial Practice (302)
- Appellate Practice and Procedure (304)
- Complex Litigation (308)
- Student Trial Lawyers Association Trial Competition (309)
- Civil Procedure Seminar (310)
- Trial Advocacy (311)
- Moot Court (312)
- Advanced Oral Advocacy (313)
- Equity (374)
- Remedies (380)
- Admiralty (386)
- Conflict of Laws (440)
- International Civil Litigation (449)

***Taxation***

- Federal Income Taxation (420)
- Federal Estate and Gift Taxation (422)
- Federal Income Taxation of Corporations and Shareholders (424)
- Partnership and Subchapter S Corporation Taxation (426)

- Tax Policy Seminar (428)\*
- Taxation—Timing of Income and Deductions (573)\*
- Special Corporate Taxation Problems (577)\*
- Nonprofit Organizations: Law and Taxation (578)
- Real Estate and Income Taxation (579)\*
- Natural Resource Taxation (580)\*
- State and Local Taxation (581)\*
- Federal Income Taxation of Foreign Business and Investment (583)
- Federal Income Taxation of Property Transactions (584)\*
- Federal Income Taxation of Trusts, Estates, and Beneficiaries (585)\*
- Deferred Compensation I (586)\*
- Deferred Compensation II (587)\*
- Tax Practice and Procedure Seminar (588)\*

***Tort Law***

- Complex Litigation (308)
- Trial Advocacy (311)
- Remedies (380)
- Insurance (382)
- Conflict of Laws (440)
- Products Liability (454)
- Toxic Tort Litigation (455)
- Medicine for Lawyers (470)\*
- Law and Medicine (472)

***Research and Writing***

- Independent Legal Writing (314)
- Law Review (364)
- Journal of International Law and Economics (366)
- Research and Writing Fellow (368)
- Graduate Independent Legal Writing (598)
- Thesis (599–600)



## Course Descriptions

The courses of instruction are described below. The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, an academic year course with two hours of credit each semester is marked (2-2) and a semester course with two hours of credit is marked (2).

In most courses, a final examination is held during the examination period and the grade in the course is determined in large part by that examination. These courses are marked "Examination."

Courses that require the preparation of a major research paper in lieu of an examination are marked "Research Paper." The satisfactory completion of such a paper by a student individually will satisfy the Legal Writing curriculum requirement for the J.D. degree.

Courses marked "Problem Assignments," "Writing Assignments," "Take-home Examination," "Research Paper or Examination," or "Clinical Work" indicate the nature of the method planned by the instructor for determining in major part the grade to be given for the course. Only research papers qualify for the Legal Writing curriculum requirement for the J.D. degree.

Day classes begin at 9:10 a.m. and run throughout the entire morning and afternoon. Most evening classes begin at 5:50 p.m. Many examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be held in the evening.

A designation at the end of a course description indicates whether the course is scheduled to be offered in the spring or fall semester or in the summer sessions and also usually whether it will meet in the day or evening. When a double-numbered course is designated "Academic year," the first half of the course is scheduled to be offered in the fall, the second half in the spring.

## Required Courses for J.D. Students

### 203-4 Contracts I-II (3-3 day)

(4-2 evening)

Nash, Pock, Gabaldon,  
Wilmarth, Hamburger

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, rescission, remedies in tort, acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof, function of consideration, conditions, assignments, third-party beneficiaries, effect of changed circumstances, protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, adversary method. (Examination)

(Academic year—day and evening)

### 207 Torts (4)

Seidelson, Schechter, Turley, Sharpe, Painter  
Liability for harm to person or property, intentional torts, negligence, nuisance, products liability, misrepresentation, defamation, and invasion of privacy, fault and other basis for shifting losses, causation, damages, effects of liability insurance, problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

### 211 Property (4)

Chandler, J. Schwartz, Johnston, Turley  
Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy, landlord and tenant relationship, concurrent estates, future interest at common law and after the Statute of Uses, introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance. (Examination) (Spring—day)

### 213 Constitutional Law I (Federal Systems) (3)

Barron, Park, Cheh, Dienes, Nolan, Lupu

Basic principles of American constitutional law, with a focus on governmental powers and the role of the Supreme Court in interpreting and enforcing constitutional norms. The nature and scope of judicial review. The case and controversy requirement and other limitations on constitutional adjudication. Powers of the

- president and Congress; the separation of powers doctrine. Relationship of the national government to state governments and principles of federalism. The state action doctrine. (Examination) (Spring—day and evening; fall—evening)
- 214 **Constitutional Law II (3)** Barron, Park, Lupu, Dienes, Nolan  
Individual rights and liberties in the American constitutional scheme and the different judicial methods of reconciling majoritarian governance with individual freedom. Privileges and immunities of national citizenship, due process of law, equal protection guarantees, freedom of expression and of religion, rights of privacy and association. (Examination) (Fall—day; spring—evening)
- 216 **Criminal Law (3)** Starrs, Robinson, Sirulnik, Craver  
An overview of the criminal justice system, dimensions of the problem of crime and goals of penal sanctions. An examination of what conduct should be made criminal and what sanctions should be applied. The theoretical anatomy of a criminal offense (elements of *mens rea* and *actus reus*), the general principles of criminal liability, and the various defenses. Special problems, such as conspiracy, inchoate crimes, causation, insanity, and complicity, are subjected to detailed analysis. (Examination) (Fall—day; spring—evening)
- 217 **Criminal Procedure (3)** Robinson, Cheh, Saltzburg, W. Brown  
Comprehensive presentation of major issues in criminal process, with heavy reliance on Supreme Court cases interpreting the Constitution. The course proceeds through the criminal justice system, from first police contact, search, interrogation, and other investigation, through the prosecution, preliminary proceedings, and trial. Problems of federalism, the exclusionary rule, and sentencing. (Examination) (Fall—evening; spring—day)
- 218-19 **Civil Procedure I-II (3-3)** Friedenthal, Raven-Hansen, Trangsrud, W. Brown, Peterson, Hardaway  
The theory and practice of civil litigation. Analysis of the goals, values, costs, and tensions of an evolving adversarial system of adjudication. Examination of the rules and statutes that govern the process by which substantive rights and duties are enforced in our federal and state courts. Topics include the relationship of procedure to substantive law, the proper reach of judicial authority, pleading, motions practice, joinder of parties and claims, class actions, pretrial discovery, trial by jury, remedies, post-trial procedure, appeals, claim and issue preclusion, and alternative dispute resolution. (Examination) (Academic year—day and evening)
- 220 **Legal Research and Writing (2)** Schultz and Staff  
Introduction to use of a law library, research experience in primary, secondary, and specialized sources of law, practice in proper legal citation form. Instruction and practice in legal writing and analysis, with primary emphasis on legal memoranda. The grade H (Honors), P (Pass), LP (Low Pass), or NC (No Credit) is given for this course. Failure to complete the work in this course will result in a grade of 45. (Fall—day and evening)
- 221 **Introduction to Advocacy (2)** Schultz and Staff  
Instruction and experience in the research and writing of pretrial motions and appellate briefs, with emphasis on preparing and presenting arguments persuasively. Also instruction and practice in preparing and presenting oral arguments. This course must be completed successfully in order to earn credit for Law 220. The grade H (Honors), P (Pass), LP (Low Pass), or NC (No Credit) is given for this course. Failure to complete the work for this course will result in a grade of 45. (Spring—day and evening)
- 222 **Professional Responsibility and Ethics (2)** Jenkins, Nolan, Morgan, Peroni  
Required course, may be taken in the second, third, or fourth years. Ethical problems involved in civil and criminal counseling and litigation. Codes of Professional Responsibility and legal discipline roles of bar associations and courts. (Examination) (Fall—day and evening; spring—day)
- 232 **Evidence (4)** Seidelson, Robinson, Saltzburg, Alvarez, Hardaway  
Preparation and presentation of evidence, including proof of writings, qualification and examination of witnesses with emphasis on impeachment, privilege, opinion testimony, determination of relevancy, demonstrative, experimental, scientific evidence, application of the hearsay rule. (Examination) (Spring—day and evening; fall—day)



## Elective Courses

- 300 Federal Jurisdiction (3)** Barron, Peterson  
 Analysis of the relationship of the federal courts to Congress and to the states. Topics may include judicial review, standing and justiciability, congressional power to regulate jurisdiction, legislative courts, federal question, diversity, removal, civil rights, and habeas corpus jurisdiction, state sovereign immunity, Supreme Court appellate jurisdiction, abstention, federalism doctrines, and federal common law. (Examination) (Fall—evening, spring—day)
- 302 Federal Trial Practice (2)** Jackson  
 Presentation of cases focusing on the critical procedural stages of litigation in federal court. Pretrial motions and discovery, including depositions of lay and expert witnesses, witness examination, introduction of evidence, courtroom techniques, and oral argument, are covered using pleadings from actual cases tried in federal court. Prerequisite: Law 218, prerequisite or concurrent registration Law 232. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—evening)
- 303 Mediation (2)** Izumi  
 Consideration of the growing use of mediation to resolve disputes. Taking the roles of mediators and disputants, students participate in a number of simulated disputes, both in and outside class. Practical and ethical questions on the process of mediation and its applications. Comparison with other forms of dispute resolution, applicability to various other areas of the law, including family, corporate, criminal, environmental, and civil rights. The class meeting time is lengthened occasionally to allow for extended simulations. Students are expected to mediate outside of class, to turn in short journal entries describing their experiences as mediators or disputants, and to write a 10–15-page paper exploring a particular application of mediation or discussing legal or ethical questions involving mediation. Enrollment is limited. (Fall—day)
- 304 Appellate Practice and Procedure (2)**  
 Study of the philosophy and mechanics of the appellate process through assigned readings, lecture, brief student oral presentations, and class discussion. The course will focus on the interplay or tension between procedural and substantive law, fact and law, merit and advocacy, deference and fairness, and the effect of these factors on the disposition of individual appeals and the clarification of law by appellate courts. (Research paper) (Spring—evening)
- 305 Negotiations (2) (Formerly Law 563)** Craver, Schultz, Geier  
 Examination of the negotiation process employed by legal practitioners. The assigned text considers the negotiation process, negotiating techniques, verbal and nonverbal communication, and other factors that influence these interpersonal transactions. Students engage in negotiation exercises that enable them to practice the art of negotiating and to examine their personal strengths and weaknesses. Grades are determined in meaningful part by the results obtained, vis à vis other class members, from these exercises. Students are also required to prepare a short paper on a topic pertaining to the negotiation process. (Fall—day and evening, spring—day)
- 308 Complex Litigation (3)** Trangsrud  
 Analysis and critique of complex civil litigation in the state and federal courts. Examination of complex joinder, the management of factually related claims in multiple venues, modern class action practice, and current developments in the law of claim and issue preclusion. Other topics covered in some years include judicial supervision of plaintiff and defendant class actions, discovery and judicial control of large cases, the role of juries, magistrates, and masters in complex cases, and problems attending complex remedies such as the use of structural injunctions to reform public schools, hospitals, and prisons. (Examination) (Spring—day)
- 309 Student Trial Lawyers Association Trial Competition (1 or 2)**  
 The Student Trial Lawyers Association sponsors an intrascholastic competition in the fall semester. The competition offers students an opportunity to practice trial skills and serves as a basis for selection of teams to represent the National Law Center at various interscholastic trial competitions. The competition requires a two-person team to prepare a written trial brief and argue its case before a judge and jury. The competition also provides a seminar on trial advocacy skills.

strategies, and techniques. Students who participate in the fall competition receive one academic credit. Those students attending interscholastic trial competitions in the spring semester receive two additional credits. Under no circumstances may a student receive more than a total of 3 hours of credit for intra- and interscholastic competitions under Law 309 and/or Law 312. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring)

- 310 Civil Procedure Seminar (2)** A. Robinson  
Study of specific problems in civil procedure. Topics will vary. The topic will be announced each year prior to registration. (Research paper)
- 311 Trial Advocacy (3)** Saltzburg, Malone, L. Schwartz, Levie  
Pretrial and trial techniques with emphasis on procedural, evidentiary, tactical, and ethical problems experienced by trial lawyers in actual cases. Complaint drafting, pretrial motions, depositions and other discovery methods, preparation of witnesses, jury selection, the use of experts, direct and cross-examination, introduction of documents, courtroom techniques, and opening and closing arguments. Role playing in simulated courtroom situations. Once registered, no student may drop this course without the express permission of the dean. Prerequisite: Law 232. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. For students who entered the law school in fall 1990 or later, this course will count toward the 1<sup>st</sup> hours that students may take on a Credit/No Credit basis. (Short papers and exercises) (Fall—day and evening; spring—evening; summer)
- 312 Moot Court (1 or 2)**  
Satisfactory participation in the preliminary rounds of the Van Vleck Moot Court competition results in 1 hour of credit; satisfactory participation in at least one additional elimination round results in 2 hours of credit. Satisfactory participation in the Jessup Cup or Giles S. Rich competition results in 1 hour of credit; finalists receive 2 hours of credit. Satisfactory participation in a trial-level, in-house competition results in 1 hour of credit. Participants in interscholastic appellate or trial-level competitions receive 2 hours of credit; however, participants in the Van Vleck Moot Court competition who received 2 hours of credit, or finalists in the Jessup Cup or Giles S. Rich competition, receive only 1 hour of credit for participation in an interscholastic competition. In no event may a student receive more than a total of 3 hours of credit for intra- and interscholastic competitions under Law 312 and/or Law 309. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)
- 313 Advanced Oral Advocacy (2)** Schultz  
Focus on persuasive use of language and oral communication skills in litigation and nonlitigation contexts. Study of historical and modern rhetoric, effective use of language, legal and other authority, facts, and speaking techniques. Students will research, write, perform, and receive feedback on oral presentations in appellate, trial, legislative, and expository settings. Enrollment limited to 20. (Writing assignments and oral presentations) (Fall—day)
- 314 Independent Legal Writing (1 or 2)** Staff  
Preparation of a research paper under the supervision of a full time member of the faculty who will determine, prior to registration, whether the work required for the topic selected justifies 1 or 2 semester hours of credit. If elected for 1 hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the faculty member is required prior to registration. See recommended guidelines under Academic Regulations. Research Papers. (Research paper) (Fall, spring, summer—as arranged)
- 318 American Legal History (2)** Hamburger  
Philosophical and historical roots of the American Constitution, with consideration of the writings of Locke, Hobbes, and Montesquieu; the natural law and social contract theories; and the application of these concepts in the debates surrounding the drafting and ratification of the Constitution. The degree to which these concepts have been reflected in decisions of the Supreme Court, with primary focus on the Marshall Court but consideration also of more recent decisions. (Examination or research paper, fall—evening) (Examination, spring—day)
- 322 Agency and Partnerships (2)** Schiller  
Employment relations, vicarious liability of employers for employees' torts, scope of employment, and independent contractors, agents' authority and appar-



ent authority to contract for their principals, ratification, nonprofit associations, the formation, operation, and termination of partnerships; limited partnerships (Examination) (Spring—day and evening)

**324 Law and Accounting (2)**

Taubman, Silver

Study of fundamental accounting principles with emphasis on corporation accounting, legal and accounting implications of specific items in financial statements of corporations; inventory adjustments, corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and problem assignments) (Fall—evening)

**325 Corporations (4)**

Green, Solomon, Gabaldon, Galston, Mitchell

Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty; insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day and evening, spring—day)

**326 Securities Regulation (3)**

Green, Painter, Gabaldon

The basic course in the study of federal and state laws governing the offering, distribution, and trading of securities. Focus on federal laws and regulations, in particular the Securities Act of 1933, the Securities Exchange Act of 1934, and the enforcement of these laws by the SEC and private parties. Prerequisite: Law 325 (Examination) (Spring—day and evening)

**327 Takeovers and Tender Offers (2)**

Painter

Federal and state regulation of corporate takeover bids and tender offers, including theories of corporate acquisitions, the Williams Act, and regulation of takeover tactics and defenses. Prerequisite: Law 325. (Research paper) (Fall—day)

**328 Regulation of Securities Markets and Professionals (2)**

Painter

Federal regulation of securities markets and professionals, including regulation of exchanges, broker-dealers and investment advisers, internationalization of markets, and SEC administrative proceedings against broker-dealers and others. Prerequisite: Law 325. (Take-home examination)

**329 Corporate Finance (2 or 3)**

Mitchell, Sloate, Solomon

General introduction to finance theory; problems in the issuance and reacquisition of corporate securities; analysis of various types of securities; problems involved in the use of debt and payment of corporate dividends; and financial analysis of mergers, acquisitions, recapitalizations, dissolutions, and liquidations. Prerequisite: Law 325. (Mitchell—examination) (Sloate—research paper) (Solomon—problem assignments)

**332 Banking Law I (3)**

Wilmarth

Federal regulation of the financial services industry, especially commercial banks. Includes an analysis of the Federal Deposit Insurance Corporation as insurer of deposits, receiver, and liquidator of troubled banks; the role of the Comptroller of the Currency as the primary federal regulator of national banks, including the chartering function, bank examinations, analysis of classified loans, capital adequacy, and enforcement of substantive federal legislation; operation of the Federal Reserve System under the Bank Holding Company Act and the various substantive regulations such as Reg. B (equal credit opportunity), Reg. J (check collection), Reg. M (consumer leasing), Reg. Q (deposit rate regulation), Reg. O (insider loan limits), Reg. E (electronic funds transfer), and Reg. Z (truth in lending); geographic deregulation and the trend toward interstate banking, and an analysis of financial services product deregulation and unification of the industry along functional lines. (Examination) (Fall—day)

**333 Banking Law II (2)**

Wilmarth

Bank holding companies, activities closely related to banking under FRB Regulation Y, outer limits of the business of banking, banks, bank holding companies, and the securities laws, savings and loan holding companies. Change in Bank Control Act; the FDIC and the troubled bank; bank liquidation and purchase and assumption arrangements; federal deposit insurance; the FDIC as receiver of a failed bank; international banking, including foreign banks in the United States, U.S. banks abroad, and foreign bank regulation of American banks abroad. (Examination) (Spring—day)

- 334 **Business Planning (2)** Green, Flyer, Press, Cooney, Cirulnick  
Integrated study of corporate, financial, tax, accounting, and SEC aspects of the following: organization of a small corporation; organization of a public corporation; stock dividends, recapitalization, and stock purchases in the context of conflict between active stockholders of a closed corporation and the family of a deceased active stockholder; corporate liquidations; corporate mergers and acquisitions; and divisions of corporations. Prerequisite: Law 325 and 420. Cooney, Press—prerequisite: Law 424. Flyer, Cirulnick—prerequisite or concurrent registration: Law 424. Enrollment may be limited by the professor. (Problem assignments) (Fall—day and evening; spring—evening)
- 336 **The Modern Corporation Seminar (2)** Solomon  
Analysis of the nature and role of the business corporation in the American and transnational political economy; evolution of the corporation and the political economy; impact of technological change on the corporation and the political economy; reasons for and consequences of the growth of large corporate enterprises; role of entrepreneurs in the political economy; relationship of corporations to the government and other centers of power. (Research paper) (Fall—day)
- 337 **Advanced Corporations and Securities Seminar (2)**  
Current issues in corporate and securities law practice and theory. Prerequisite: Law 325. (Research paper)
- 338 **Labor Law (3)** Craver, Crain  
Law governing labor-management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—evening; spring—day)
- 339 **Individual Employment Rights (2 or 3)** Cacoza  
Individual rights and obligations in employment; exploration of common law and statutory regulation of the individual employment relationship from its inception to its termination; emphasis on current developments such as wrongful discharge, medical screening, drug testing, employer-provided health insurance and child care, occupational safety and health, workers' compensation, and retirement issues. (Examination) (Fall—evening)
- 340 **Collective Bargaining and Labor Arbitration (2 or 3)** Cracraft  
Negotiation, content, and administration of collective bargaining agreement through the grievance procedure and arbitration; problems in negotiation and administration of collective labor agreements. Prerequisite: Law 338 or permission of instructor. (Negotiation and arbitration exercises) (Spring—day)
- 341 **Labor and Employment Law Seminar (2)**  
Group study of contemporary problems relating to labor and employment law. Enrollment limited. (Research paper)
- 342 **Administrative Law (3)** Park, Raven-Hansen, J. Schwartz, Mitchell  
Study of the administrative process in executive and independent regulatory agencies; emphasis on judicial review. Formal and informal decision-making, investigation, planning, and public administration functions of the agencies as related to their legal limits and to the roles of lawyers in government and private practice. Relationships of agencies to the executive and legislative branches, to public and private interest groups, and to the social, political, and economic aspects of various philosophies of government regulation. This course is a prerequisite to several advanced public law courses. (Examination) (Fall—day, spring—day and evening)
- 344 **Public Law Seminar (2)**  
Group study of specific problems of public law; selection will vary with the professor and from year to year. See special posting for the current semester. Prerequisite: Law 342 and 362.
- 345 **Regulated Industries (2)** Morgan  
Substantive problems of business regulation in terms of natural monopolies, licensed industries, subsidized industries, and safety regulation. Typical problems raised include the role of intervenors, the impact of regulation upon management and market behavior, the uses and abuses of economic evidence, the role of agencies' staffs, interagency planning and regulation, and the effects of judicial and legislative review. Each student selects one industry and develops an



insight into economic regulation in terms of that industry's firms, market structure, growth and development, trade associations, and regulatory agencies (Research paper) (Fall—day)

**350 Constitutional Law Seminar (2)**

Peterson

Group study of contemporary problems in constitutional law, process of constitutional litigation; problems of effectuating constitutional guarantees. Limited enrollment. (Research paper or examination) (Fall—day, spring—day)

**352 Mass Communications Law—Print Media (2)**

Dienes

Study of the text, historical origin, and theoretical foundation of the Press Clause and of the role played by the mass media in modern society. Examination of the common law and constitutional protection accorded mass media publishing in areas such as libel law, the law of privacy, and liability for physical, emotional, or economic harm. The legal status of newsgathering, including problems of journalist's privilege and access to information possessed by government. Possible other topics: a right of access to the media, the student press, the press in other countries, restraints on press solicitation, advertising and promotion, and the press and national security. (Barron—examination or research paper), (Dienes—examination) (Fall—day)

**353 Mass Communication Law—Electronic Media (2)**

Barron

Study of the origins and development of electronic media and an examination of the continuing debate over regulation and deregulation of broadcasting. The allocation of the broadcasting spectrum, licensing and licensing renewals, and regulation of programming content. Problems posed by concentration of media ownership and the efforts to promote minority participation in ownership and management of broadcasting. The relation of government to public (noncommercial) broadcasting. The development of cable television and problems in regulation and deregulation, including issues of jurisdiction, franchising, syndication or programming, regulation of content control, and mandatory public access. The emergence of new communications technologies and the legal problems they pose. (Barron—examination or research paper), (Dienes—examination) (Spring—day)

**358 Individual Rights and Liberties (3)**

Principles of equality and due process in the Fifth and Fourteenth Amendments. The power of Congress to enforce the Fourteenth Amendment. Focus on individual rights and liberties under the U.S. Constitution. First Amendment rights, particularly religion and speech clauses. The right of association. Other personal rights in the Bill of Rights. Methodology of judges in deciding cases involving individual rights and liberties, particularly the balancing test and the judges' views of societal interests. Prerequisite: Law 212.

**359 Civil Rights Legislation (3)**

Dienes

Examination of federal legislation protecting individual rights and liberties as well as the administrative and judicial implementation of that legislation. Remedial provisions for the enforcement of federal constitutional and statutory rights (e.g., 42 U.S.C. §§1983, 1985) and federal statutes prohibiting discrimination in housing, contractual relations, voting, education, and federally funded programs. (Examination) (Spring—day)

**360 Immigration Law (2)**

Grussendorf

Law and practice under the McCarran-Walter Act, involving questions of immigration, emigration, expatriation, nationality, and naturalization. Consular, Immigration and Naturalization Service, and Labor Department practice. (Examination) (Fall—evening)

**361 Refugee and Asylum Law Seminar (2)**

Grussendorf

Selected topics from the areas of international law pertaining to the protection of refugees and domestic law of political asylum. Prerequisite: Law 360. (Research paper) (Spring—day)

**362 Legislation (2)**

Block, Cacoza

Legislative process and the construction and legal effect of statutes. Topics that may be considered include representational structures, lobbying, judicial review, direct democracy, legislative fact-finding and drafting, and the preparation and significance of legislative history. This course is a prerequisite to several advanced public law courses. (Examination) (Fall—evening, spring—day)

- 364 Law Review** (1 or 2 per semester) Staff  
 Limited to members of the student staff of the *Law Review*. A maximum of 4 semester hours of credit may be earned in this course. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—day and evening)
- 366 Journal of International Law and Economics** (1 or 2 per semester) Staff  
 Limited to members of the student staff of the *Journal of International Law and Economics*. A maximum of 4 semester hours of credit may be earned in this course. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—as arranged)
- 368 Research and Writing Fellow** (2) Schultz  
 Limited to students selected as Dean's Fellows to assist in teaching first-year Legal Research and Writing (Law 220) and Moot Court (Law 221). Two semester hours may be earned in both the fall and spring semesters. The grade of CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—day and evening)
- 370 Sales and Sales Financing** (2) Zubrow  
 Provisions of the Uniform Commercial Code relating to sale and distribution of goods, including bulk transfers, warehouse receipts, bills of lading, and other documents of title; particular attention to secured transactions and financing devices utilized in this connection. (Examination) (Fall—day; spring—evening)
- 371 International Commercial Law** (2) Spanogle  
 The study of international transactions for the purchase, sale, payment for, and financing of goods, as governed by the U.N. Convention on Contracts for the International Sale of Goods and other multilateral treaties on international lease financing, factoring, commercial paper, and fund transfers. The substantive provisions of these treaties, the process by which they are developed, and the various interpretive approaches available under different legal regimes will be considered. Prerequisite: Law 406 or permission of the instructor. (Examination or research paper)
- 372 Commercial Paper, Check Collection, and Banking** (2) Zubrow, Seita  
 Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice: Federal Reserve regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Fall—evening; spring—day)
- 374 Equity** (2) Pock  
 Evolution of equity jurisprudence and its administration of a remedial scheme separate and distinct from that administered by common law jurisprudence. Constitutional and systemic limitations upon equity. Effect of merger of common law and equity courts on the federal and state level. Temporary and permanent injunctive relief, specific performance, cancellation, restitution, reformation, constructive trusts, equitable liens, marshaling, equitable writs, and equitable defenses, such as *laches*, *estoppel in pais*, and "unclean hands." Relative efficacy and availability of equitable and legal remedies. (Examination) (Summer)
- 378 Creditors' and Debtors' Rights** (3) Zubrow, Galston  
 Creditors' remedies and debtors' protections under state law: writs of attachment, garnishment and execution, acquisition of liens and forced sales of property, self-help arrangements, and security agreements. Bankruptcy under federal law: who may file, the creation and administration of the bankruptcy estate, powers of the trustee, discharge of debt, rehabilitation plans for individuals under Chapter 13. (Examination) (Fall—day; spring—evening)
- 380 Remedies** (3) Sharpe  
 Development and use of judicial remedies that give relief for past or threatened injuries to interests of personality and property. Remedial approaches include compensatory and punitive damages, injunctions, unjust enrichment, constructive trusts, equitable liens, tracing, subrogation, and specific reparation. Emphasis on comparing remedial options in fraud, mistake, duress, breach of contract, and abuse of fiduciary relationships. (Examination) (Spring—day)



- 382 Insurance (2)** Schiller, Pock  
A primary risk distributing medium and the rules by which legislative, administrative, and judicial bodies seek to promote its benefits and avert its dangers. Insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Spring—day; summer)
- 383 Sports Law (2)** Babby, Levinstein  
Selected issues involving professional sports including contract, arbitration, labor, and antitrust law. Significant contemporary developments. (Examination) (Fall—evening)
- 386 Admiralty (3)** Sharpe  
United States law of transportation by water (vessels, cargoes, services, and persons). Substantive maritime law, procedures of resolving maritime disputes by litigation, arbitration, and administration. Legal aspects of processes such as planning shipping transactions, anticipating disputes through contract, statute, and treaty; creating and amending national and international shipping law; adjusting conflicts between courts and advancing toward a uniform maritime law. (Examination) (Spring—day)
- 390 Trusts and Estates I (3)** Chandler, Johnston, Sims  
Noncommercial transfers of wealth at death or during life: essential elements and formalities for creation of trusts and execution of wills; revocation and alteration; grounds for contest; limits on property owner's power to control; intestate succession. Prerequisite: Law 211. (Examination and problem assignments) (Fall—day; spring—day and evening)
- 391 Trusts and Estates II** Bradford  
Dispositive provisions with regard to property transfers, wills, and trusts; common questions of construction; future interest problems; administration of estates and trusts; charitable trusts. Prerequisite: Law 390. (Drafting assignments and examination) (Spring—evening)
- 394 Community Property/Marital Property (2)** Ridder  
Legal rules and planning considerations with respect to property owned and acquired by married persons. Primary emphasis will be on the law of the eight community property states, but special attention will also be given to the parallel problems seen under the now widely enacted statutes creating judicial power to decree an equitable distribution of a divorcing couple's marital property. As time permits, federal tax rules and considerations will also be discussed. (Research paper or examination) (Fall—day)
- 395 Estate Planning Seminar (2 or 3)** Blake  
Study of the effective disposition of wealth by inter vivos gift and testamentary transfer; emphasis on income, estate, and gift tax considerations; use of the trust form in the transfer of wealth; use of insurance and jointly held property as part of the estate plan; planning for the continuation or disposition of the client's business interests. Preparation of an estate plan with supporting documents is the major project for the course. Prerequisite: Law 390, 420 and 422. Enrollment limited by the instructors. (Examination) (Fall—evening)
- 398 Modern Real Estate Transactions (3)** J. Brown  
Basic course in conveyancing. Current problems in purchase and sale of residential real estate; legal and equitable rights, responsibilities, liabilities, and remedies of buyer, seller, broker, escrow agent, conveyancing attorney, surveyor, title examiner, abstractor, and lender; interim and permanent mortgage finance; discounts points, "subject to" and "assumptions," remedies on default, including foreclosure processes, process of examination and assurance of title and other interests in realty, including recording, registration, and title insurance systems; settlements and closings; warranties of title; habitability and structural integrity; risk-of-loss problems; property-casualty insurance; use restrictions; encumbrances on title, and clearing of title; problems related to encroachments, easements, adverse possession, and compliance with subdivision, zoning, building, and housing code regulations; emerging problems related to cooperatives, condominiums, and property owners associations. (Examination) (Spring—day)

- 402 Planning, Zoning, and Land Use Law (2)** Feola, Gordon  
Problems, solutions, emerging concepts, and constitutionality of land use regulations, including zoning, subdivisions, historic preservation, exactions, vested rights, transfer of development rights, growth management, and urban and regional planning. This course provides the foundation for Law 403, 404, and 408 (Writing assignments and examination) (Fall—evening)
- 403 Current Problems in Land Use Management and Control Seminar (2)** J. Brown  
The constitutional "taking" issue: assessment of emerging mechanisms, processes, and institutional innovations for exercising public and private management and control of land use; consideration of regional regulatory standards for land use as a desirable or necessary alternative to local controls and of the prospect that such process will satisfy the *Nollan* "nexus" requirement; critical analysis of TDRs, linkage and other off site exactions, impact fees, proffers, etc.; problems of affordable housing and available responses. Students may participate in microsimulation activities (Research paper) (Spring—day)
- 404 Land Use Administrative Process (2)** Delaney, Kominers  
Selected problems in urban development and housing, with particular emphasis on programs under current enabling legislation and federal and state court decisions. Analysis of various public and private decision processes through which conflicts over land use are resolved. Simulation of a complex zoning hearing. Prerequisite: Law 402 or permission of instructor. (Writing assignments) (Spring—evening)
- 408 Land Development Law (4)** J. Brown  
(Simulation course)  
Students participate in a semester-long simulation process encompassing 42 months of "game time." As junior associates in various hypothetical law firms or offices, students represent their assigned clients, with all interactions based on actual situations and often incorporating recent or ongoing cases of major significance. All levels of judicial, administrative, and legislative activity are involved. Enrollment limited by instructor. (Writing assignments) (Fall—day)
- 409 Local Government Law (2)** J. Brown  
Decision making processes in metropolitan and other municipal-level governments, types and objectives of city, county, and special function local government units, intra- and intergovernmental relations, initial organization and changes in form and function of local governments, personnel matters; local legislative and administrative authority and processes, financial processes; governmental vs. proprietary functions; responsibility in tort; insurance issues; introduction to community planning; extraterritorial powers; joint-power agreements and compacts. (Examination or research paper) (Fall—day)
- 410 Environmental Law (3)** Turley  
An introductory course focusing primarily on the statutes administered by the Environmental Protection Agency. Topics covered include NEPA, the Clean Water Act, the Safe Drinking Water Act, the Solid Waste Disposal Act/RCRA, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Not for credit toward an LL.M. in environmental law. (Examination) (Fall—day)
- 411 Air Pollution Control (3)** Reitze  
An in-depth analysis of the Clean Air Act, focusing on legal problems common to environmental law. Topics covered include standard setting, technology-based controls, development of pollution control plans, monitoring, inspection, enforcement, economic controls, energy trade-offs. (Examination) (Spring—day)
- 414 Clinical Studies in Environmental Law (1, 2, 3, or 4)** Reitze  
The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest environmental organization. Admission to the course requires second-semester second-year, third-year, or graduate standing and permission of the Director of the Environmental Law Program. Students who have mastered the fundamentals of environmental law are selected for this course. Normally this will require



completion of at least Law 410. JD students may repeat the course for a maximum of 8 semester hours of credit. Students in the LL.M. in environmental law program may earn no more than 4 semester hours of credit. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Five hours of work per week are required for each credit. (Fall and spring—day, summer)

**415 Occupational Safety and Health Legislation (2)**

The Occupational Safety and Health Act of 1970 and related legislation. (Short papers)

**420 Federal Income Taxation (3)**

Solomon, Sims, Block, Peroni

Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. (Examination) (Fall—day and evening, spring—day)

**422 Federal Estate and Gift Taxation (2)**

Nudelman

Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction, and split gifts. (Examination) (Spring—evening)

**424 Federal Income Taxation of Corporations and Shareholders (3)**

Block, Painter

Continuation of Law 420. Primary emphasis on corporate-shareholder relationships. Problems of corporate dividends, redemptions of stock, distributions in partial and complete liquidation, stock dividends, bail-outs, and dividends in kind. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses (including collapsible corporations), mergers and acquisitions, and corporate divisions. Prerequisite: Law 420. (Examination) (Spring—day and evening)

**426 Partnerships and Subchapter S Corporation Taxation (2)**

Sanders

Income tax problems of partnerships and tax-option corporations (Subchapters K and S of the Internal Revenue Code of 1954). Practice-oriented study of partnerships, including syndication, organization, and structure of entity, with emphasis on policy examination of areas of IRS principal concern, including tax shelters, disproportionate tax allocations, retroactive allocations, guaranteed payments to partners, contributions of capital, basis for gain or loss, passive activity loss, non-recourse financing, "at-risk" rules, current and liquidating distributions, sale of partnership interests, collapsible partnerships, "like-kind" exchanges, termination, special basis adjustments, and distributions to retiring or deceased partners. Planning-oriented analysis of Subchapter S, including procedures for electing and terminating Subchapter S status, treatment of income and losses, limitations on deductibility of losses, and how to avoid pitfalls. (Examination) (Spring—evening)

**428 Tax Policy Seminar (2)**

Block

Intensive study of selected aspects of the tax structure with primary attention given to the federal income tax. Problem areas are reviewed primarily from the standpoint of tax policy, including legal, economic, social, and practical considerations. Alternative solutions, including current legislative proposals, are examined. Prerequisite: Law 420. Recommended: Law 424. (Research paper)

**429 Labor Standards (2)**

Ginsburg, Abrahams

Analysis of the Fair Labor Standards Act—its scope, exemptions, and remedial procedures; the laws establishing labor standards for government contracts, including the Davis-Bacon Act, Walsh-Healey Act, Service Contract Act, and Work Hours Act; the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination) (Spring—evening)

**430 Labor Relations in the Federal Service (2)**

Tobias

Study of the Civil Service Reform Act, with emphasis on the structure and case law developed by the Federal Labor Relations Authority, Federal Service Impasses Panel, and Merit Systems Protection Board. Parallels are drawn between federal sector, nonfederal public sector, and private sector decisions. (Research paper)

- 431 **Employment Discrimination Law (2)** Craver, Morris  
Federal laws and executive orders relating to various types of discrimination in employment, including Title VII of the Civil Rights Act of 1964, the Equal Pay Act, the Age Discrimination in Employment Act, the Rehabilitation Act, the Civil Rights Act of 1866, the Fourteenth Amendment, the National Labor Relations Act, and Executive Orders 11,246 and 11,375 relating to government contractors, substantive rights, exemptions, and burdens of proof under the various laws and regulations. (Examination) (Fall—evening; spring—day)
- 432 **Employment Discrimination Claims and Litigation (2)** Morris  
Processing of claims involving employment discrimination before the Equal Employment Opportunity Commission and in federal court; problems encountered by attorneys for both plaintiffs and defendants; practice in drafting pleadings that attorneys prepare in connection with employment discrimination litigation. Prerequisite: Law 431 or permission of instructor (Problem assignments) (Spring—evening)
- 434 **Domestic Relations (2)** Crain, Valdez  
Focus on the role of the family in society and related legal issues. Formal marriage and its alternatives, such as contract living arrangements, are examined. Emphasis on divorce and its effects on the members of the family, including economic consequences and the consequences for children. The legal aspects of parenthood are also discussed, including responsibilities of parenthood, legitimacy and illegitimacy, new reproductive techniques, and adoption. (Crain—examination) (Valdez—examination and project) (Spring—day and evening)
- 436 **The Child, the Family, and the State (2)** Ridder  
Focus on the rights of children, particularly in the family and criminal law areas. Among the subjects covered are child custody, support, medical treatment, neglect, status offenders, and delinquency. (Examination or research paper) (Fall—day)
- 437 **Law and Psychiatry Seminar (2)**  
Designed to expose the lawyer to basic constructs of psychiatry and psychology and to explore their implications in legal rules and practice. Psychiatrists and psychologists actively involved in teaching process. Topics include psychological testing and other assessment techniques, psychiatric evaluations and reports, child custody and other family law issues, privilege and confidentiality, competency in civil and criminal contexts, criminal law matters (including criminal responsibility and dispositional issues), civil commitment, right to treatment, right to refuse treatment, experimental procedures, and informed consent. Problems of counseling, legal ethics, preparation for trial, direct and cross examination, and other aspects of practice considered. There is ordinarily at least one session in a mental institution. (Research paper or examination)
- 438 **Comparative Law (3)** Brand  
Comparison of the world's major legal systems: civil, common, Islamic, and socialist. Consideration of the history and sources of law of each and a review, concentrating on the civil law system, of hallmark institutions, the role of lawyers, procedure, and selected substantive legal issues. Emphasis on issues and problems of the international lawyer, including conflicts among and harmonization of the legal systems, the migration of legal ideas, and pleading and proving foreign law. (Examination) (Spring—day)
- 440 **Conflict of Laws (3)** Seidelson, Rock  
Legal problems arising from occurrences transcending state or national boundaries, jurisdiction, foreign judgments, constitutional influences, theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. (Examination) (Fall—evening, spring—day)
- 442 **Jurisprudence (2)** Chandler, Galston  
Basic jurisprudential concepts, nature of law, development of legal institutions, jurisprudential schools—natural law, analytical, historical, sociological, functional law and logic, law and justice, the judicial process, legislative, executive, administrative decision making, impact of politics, economics, and scientific advance on legal systems, contemporary trends in jurisprudential thought. (Chandler—research paper) (Galston—examination) (Fall—day, spring—day)



#### 443 Foreign Relations, National Security, and the Constitution (2)

Raven-Hansen

Examination of legal issues raised by national security abroad (including general war, imperfect war, covert war), internal security (including emergency powers, domestic uses of the military, surveillance and surreptitious entry, and federal personnel security) and access to national security information (the FOIA, state secrets privilege, prior restraints, and leak control). Includes study of those parts of foreign relations law that involve national security. (Examination) (Spring—day)

#### 444 International Law (3)

Steinhardt, Buergenthal, Alvarez

An introduction to international law that provides the background for specialized seminars. Emphasis on national states as participants in decision-making processes, with consideration of public bodies and other participants; analysis of range of available sanctions, roles and effects of international agreements under the U.S. Constitution; introductory study of humanitarian law. Complements but does not repeat material in Law 447. (Examination) (Fall—day and evening, Spring—day)

#### 446 International Business Transactions (3)

Steinhardt, Seita

U.S. law and practice relating to characteristic forms of international transactions, including the transnational sale of goods (the law governing the documentary sale, various forms of letters of credit, commercial terms and insurance), the export of technology through franchising, distributorship, and licensing contracts, and the export of capital through the establishment, operation, and withdrawal of foreign direct investment. The impact of relevant international organizations and/or emerging substantive international commercial law (e.g., the United Nations Convention on Contracts for the International Sale of Goods and other treaties on international negotiable instruments, international lease financing, and international factoring). Specialized problems in the negotiation and drafting of international contracts. (Examination) (Fall—day, spring—evening)

#### 447 International Organizations (2)

Alvarez

Analysis of characteristic legal issues arising out of the creation and operation of organizations of nation states. Included are issues of legal personality, treaty making and norm creation, privileges and immunities, membership, dispute settlement, and withdrawal. Exemplary problems in distinct institutional settings, including the United Nations, the International Labour Organization, the International Civil Aviation Organization, the Organization of Economic Cooperation and Development, the International Monetary Fund, and Inter American organizations. Prerequisite or concurrent registration: Law 444 for post-J.D. students. Permission of instructor may be substituted. (Examination or research paper)

#### 448 International Arbitration (2)

Survey of arbitration and related mechanisms of dispute resolution in the international legal system that arise out of commercial, financial, and governmental transactions. Analysis of the arbitration agreement, the process of arbitration, and the enforcement of arbitral awards as well as the common principles governing the disposition of claims. Review of the various arbitral tribunals and their rules. Prerequisite or concurrent registration: Law 444 or 446 for post-J.D. students. Permission of instructor may be substituted. (Research paper or examination)

#### 449 International Civil Litigation (2)

Steinhardt

Analysis of the law relevant to the trial of cases having international elements in U.S. domestic courts, including the problems of establishing jurisdiction over foreign defendants, obtaining transnational discovery and service of process, enforcing foreign judgments, drafting and defending choice of forum and choice of law clauses, determining the extraterritorial reach of U.S. law, proving foreign law, and assessing the role of U.S. courts in deciding cases with potential consequences for U.S. foreign relations. Analysis of the impact of international issues on actual litigation as well as the initial structuring of a transaction in light of the client's potential litigation interests. Prerequisite or concurrent registration: Law 444 for post-J.D. students. Permission of instructor may be substituted. (Examination or research paper) (Spring—day)

#### 450 Unfair Trade Practices (3)

Schechter

Unfair trade practices at common law and under modern legislation; privilege to enter markets and compete; interference with contractual relationships; trade-

marks and trade names; imitation of product appearance; misappropriation of ideas and trade secrets; right of publicity; basic copyright principles; protection of competitors and consumers against false advertising and unfair or deceptive practices under the Federal Trade Commission Act, the Trademark Act, and state unfair trade and consumer protection statutes; price and service discrimination under the Robinson-Patman Act and state legislation. Credit may not be earned for both Law 450 and 560. (Examination) (Spring—day)

**452 Federal Antitrust Laws (3)**

Federal antitrust law and policy under the Sherman, Clayton, and FTC Acts; basic economic theory of free market operation; the Rule of Reason and *per se* offenses; price fixing, market division and related agreements under Sherman Act §1; conspiracies, boycotts, trade association activities; measurement of industrial concentration; monopolization and attempts to monopolize under Sherman Act §2; mergers and joint ventures under the Sherman and Clayton Acts; resale price maintenance; and other vertical restraints; exclusive dealing and tie-in agreements under the Clayton and Sherman Acts; selected exemptions from antitrust liability. (Examination) (Fall—day; spring—evening)

Morgan

**454 Products Liability (2)**

Development of the concept of products liability and consumer remedies. Survey of civil actions for harm resulting from defective and dangerous products in negligence, warranty, nuisance, fraud, misrepresentation, and other cases. Problems associated with hazard identification, insurance, and industry self-regulation. Review of current legislation dealing with injuries and remedies in specific areas. (Examination) (Spring—day)

T. Schwartz

**455 Toxic Tort Litigation (2)**

The use of common law remedies to compensate those injured by diseases characterized by long latency periods and, usually, relatively low levels of exposure. Insurance, workers compensation, and evidentiary issues. (Examination) (Spring—evening)

Hicks, Donley

**456 Professional Responsibility and Ethics Seminar (2)**

Selected topics in professional responsibility and ethics. Intensive study of questions of lawyer responsibility and ethics raised by professional codes and moral philosophy. Prerequisite: Law 222. (Research paper)

Morgan

**457 Jurisprudence Seminar (2)**

Intensive legal theory relevant to topics to be selected by the instructor. Prerequisite: Law 442 at the discretion of the instructor. (Research paper or examination) (Spring—day)

Galston

**460 Consumer Mediation Clinic (2 or 3)**

Open to second and third-year students (first-year students may participate during the summer of their first year). Students act as neutral third parties who help consumers and businesses resolve disputes by negotiating mutually agreeable settlements. Students perform case intake, provide information and referrals, and mediate assigned cases involving a variety of consumer issues (debt collection, credit problems, defective goods and services, home improvement contracts, etc.). Students develop problem-solving techniques as they apply local and federal consumer laws. Students must complete four hours of clinic work per week for each credit earned (includes mandatory seminar) and must present a brief paper analyzing one of their cases. Advanced students may have an opportunity to conduct mediation sessions for consumer cases filed in the D.C. Department of Consumer and Regulatory Affairs Complaint Division. Students work under the guidance of a supervising attorney with the help of more experienced student directors who also provide administrative support. Permission of the instructor required prior to registration. The grade of H (Honors), P (Pass), LP (Low Pass), or NC (No Credit) is given for this course. (Fall, spring, summer)

Jones

**461 Small Business Clinic (3 or 4)**

Under the supervision of the instructor, students assist small businesses and nonprofit organizations with a wide variety of legal issues, including drafting incorporation and partnership papers (such as articles of incorporation and bylaws), compliance with local licensing requirements, reviewing and drafting contracts and leases, advising on tax problems and related matters. 15–20 hours of work per week required. Prerequisite: Law 325 and 420 and permission of



instructor. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. (Fall, spring, summer)

**462 Trade Regulation Seminar (2)**

Group study of current problems relating to unfair trade practices and federal antitrust laws. (Research paper)

**463 Outside Placement (arr)**

Students arrange independent projects with state or federal public interest organizations for academic credit. A compilation of suggested projects is available at the Community Legal Clinics office. Projects must receive prior approval by the instructor. Students who wish to work with the bankruptcy division of *Law Students in Court* for 2 or 3 credits should register for this course. The grade of *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall, spring, summer)

**464 Trade Secret and Patent Law (2)**

An overview of the cases and statutes relating to trade secrets and a broad study of the law of patents. The course is designed for the nonspecialist but provides a sound foundation for those who intend to specialize in the patent field. (Examination) (Fall—evening)

**466 PTO Practice in Patent Matters (2)**

Substantive and procedural law of patents leading to issuance of patent, mainly related to proceedings before the U.S. Patent Office. Obtaining and preserving earliest possible patent filing date; continuing applications; *res judicata*; novelty and nonobviousness requirements; substantive rules of priority of invention and related affidavit practice; nature of claims and formal defects; double patenting. Designed for students intending to specialize in patent law. Prerequisite: Law 464 (Examination) (Spring—evening)

**58 Computer Law (3)**

A critical study of selected major legal problems presented by computer technology, including the impact upon legal doctrine and legal institutions. Jurimetrics, the theory of various uses that are and may be made of computers in legal research, the practice of law, and court administration will be examined. Familiarity with the rudiments of computer science or programming would be helpful, but is not required. (Examination) (Fall—day)

**59 Law of Privacy Seminar (2)**

A review of the law of privacy as it has developed in constitutional litigation, tort law, and state and federal statutes. Current developments and rationales for further expansions of privacy rights are considered. (Research paper) (Fall—day)

**60 Medicine for Lawyers (2)**

Survey of the basic medical sciences and the rudiments of clinical medicine as encountered in the practice of law. Medical terminology, the disease process, trauma, and industrial medicine. The application of this fundamental information is demonstrated in personal injury or negligence and malpractice litigation as well as in commitment and equitable proceedings. Emphasis on enabling the lawyer to communicate most effectively with medical specialists. (Examination)

**2 Law and Medicine (2)**

Malpractice, insurance, and alternatives to professional liability litigation; securing and presenting medical evidence to prove causation and damages; chemical test data and behavioral science findings in court; entry into and practice of the professions; professional organizations; hospitals; professional service delivery; public policy intervention in medical science—for example, abortion, transplantation, and coerced treatment. (Examination) (Spring—evening)

**Drugs and the Law Seminar (2)**

A study of federal and state laws controlling illicit drugs, including the historical evolution of these laws, current offenses and penalties, constitutional limits on the criminal sanction, enforcement practices, and sentencing considerations. Alternative models for controlling drugs, including decriminalization and legalization will also be studied. Six class sessions will be devoted to mock criminal trials at which student teams conduct direct and cross-examination of guest expert witnesses in the field. Other students may be assigned to internships with the U.S. Attorney's Office, Public Defender Service, or other institutions involved in drug law or policy. All participants will be graded on the basis of assigned

- memoranda pertaining to the legal issues involved in the mock hearings or internships, or special research papers assigned by the instructors. Prerequisite: Law 232. (Writing assignments) (Spring—day)
- 475 **Law, Science, and Technology Seminar** (2) Green  
Reciprocal relationships between law and science: absorption of scientific concepts into substantive law through adjudication, legislation, and rule making techniques and procedures used in handling, developing, and deciding scientific issues. (Research paper) (Spring—day)
- 476 **Prisoners Project** (1, 2, or 3) Turley  
Open to second- and third-year students. A clinical project concerned with the legal status of older prisoners (over 55 years of age). The project works for the release of high-cost, low-risk prisoners into stable environments. Students work on either individual cases or research. Case workers interview prisoners to evaluate and prepare cases for pardon, parole, or possible *habeas* appeals. Research projects will cover subjects ranging from overcrowding to health care to risk assessment. Some legislative work is also possible. (Fall, spring, summer)
- 477 **Federal Sentencing Seminar** (2) Nagel  
A review of the history of structuring judicial discretion at sentencing and of extant theories of sentencing will provide the background against which to understand and evaluate the new federal sentencing guidelines. An in-depth examination of the Sentencing Reform Act of 1984 will be followed by a review of the structure of the federal sentencing guidelines and the key policy issues that guided their development. Prerequisite: Law 217 or permission of the instructor. (Research paper) (Fall—day)
- 478 **Law and Criminology: Search for the Causes of Criminal Behavior** (2) Courtless  
The role that criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such causal theories. (Research paper) (Fall—day)
- 479 **Law of Criminal Corrections: Society's Responses to the Criminal Offender** (2) Courtless  
Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavioral scientists charged with effectuating these strategies. Prerequisite: Law 478. (Research paper) (Spring—day)
- 482 **Disabled People and the Law** (2) Banzhaf  
Examination of those areas in which persons with disabilities have traditionally been denied some right or benefit afforded other persons in our society and have resorted to legal action: introduction to statutes and agencies designed to protect people with disabilities. Students may choose to prepare a research paper (and receive legal writing credit and a numerical grade) or to gain practical experience doing a clinical project (on a CR/NC basis)
- 483 **National Center for Law and the Deaf** Banzhaf  
**Clinical Education Activities** (1, 2, or 3)  
Work with the National Center for Law and the Deaf in bringing legal information, services, and representation to the more than 13 million Americans who are deaf or hearing impaired. The Center is designed to help make the hearing impaired aware of their legal rights and to assist them in solving their legal and law-related problems. Students may participate in one or more projects: (1) counseling persons with hearing impairments about legal problems at a walk-in clinic usually held on the Gallaudet College campus; (2) preparing and participating in workshops for hearing impaired persons to acquaint them with their rights and



obligations under the law; (3) assisting in representing the interests of deaf and hearing-impaired persons in judicial and administrative proceedings; (4) preparing research papers on topics related to law and the deaf or preparing handbooks explaining legal topics to the hearing-impaired. Students may learn some sign language but will be assisted by trained translators when dealing with deaf individuals. Approximately 60 hours of work per semester is required for each credit hour. Students may repeat this course for a maximum of 8 semester hours of credit. This course may not be taken at the same time as Law 495 or any litigating activities in Law 493. The grade of CR (Credit) or NC (No Credit) is given for this course.

**484 Gender Discrimination and the Law (2)**

Ridder

An examination of the treatment of women in all areas of the law and legal remedies for sex discrimination. Emphasis on constitutional law, family law, and discrimination in employment. Enrollment limited to 30 students. (Examination or research paper) (Spring—day)

**485 Comparative Public Procurement (2)**

Cibinic

A comparative study of laws, regulations, and procedures dealing with public procurement: examination of special problems encountered in business dealings with sovereign states; analysis of contract formation, performance, and dispute resolution processes; consideration of influence of international organizations such as the European Economic Community (EEC), United Nations Commission on International Trade Law (UNCITRAL), General Agreement on Tariffs and Trade (GATT), financing institutions, and professional organizations; identification of differences between national and international procurement practices. Prerequisite or concurrent registration Law 444, 486 or 487, or permission of instructor. (Problem assignments) (Fall—evening)

**486 Government Contracts (3)**

Survey of basic law underlying government procurement, basic power and limitations on federal government in entering into contracts, administrative and legislative policies governing these contracts, advertised and negotiated procurement procedures, forms of contracts and clauses used. Law 487 is the substantial equivalent of this course. (Examination and problem assignments)

**487 Government Procurement Law (4)**

Cibinic, Lees

Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. The course focuses on the contract formation process, including techniques for awarding contracts and litigation and protests involving awards. Law 486 is the substantial equivalent of this course. (Examination and problem assignments) (Fall—evening)

**488 Performance of Government Contracts (4)**

Nash, Lees

Discussion of the substantive problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses; analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. Analysis of the methods that can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief. Law 489 is the substantial equivalent of this course. (Examination and problem assignments) (Spring—evenings)

**489 Administration of Government Contracts (3)**

Interpretation of contracts and the legal principles governing the risk allocation between the contracting parties. Contractor claims against the government for changes, differing site conditions and delays. Government enforcement of its contract rights for timely performance of work complying with the specifications. Terminations for default and the convenience of the government. Procedures for litigating disputes between the parties. Law 488 is the substantial equivalent of this course. (Examination and problem assignments)

**490 Government Contracts Seminar (2)**

Nash, Lees

Research and discussion of selected problem areas. (Research paper) (Spring—day)

#### 491 Government Contracts Cost and Pricing (2)

Legal aspects of government contract accounting principles and allowability of costs. Cost accounting standards and cost allocation issues. Negotiation of cost, profit, and price. Disclosure of cost accounting data. (Problem assignments) (Fall—day)

#### 492 Intensive Clinical Placement (arr)

Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest nonprofit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law Center Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of semester hours of credit to be granted. A maximum of 10 semester hours of credit may be taken in one or two semesters. This course is open to a limited number of third year law students. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring)

#### 493 Administrative Advocacy Clinic (2)

This clinic allows second- and third-year students to represent indigent and elderly claimants in a variety of administrative forums. Under the supervision of clinical faculty, students work on cases for clients who have benefit claims before state and federal agencies. Students work in the areas of Social Security disability, Unemployment Compensation, Medicaid and Medicare, Aid to Families with Dependent Children, and other public benefits programs. Students also gain experience drafting wills, powers of attorney, living wills, and other legal documents. Students are expected to work 8 hours per week and attend a two-hour seminar, in which they learn substantive law and participate in simulation exercises to complement their clinical work. The grade of H (Honors), P (Pass), LP (Low Pass), or NC (No Credit) is given for this course. (Fall, spring, summer)

#### 494 Immigration Clinic (2, 3, or 4)

Clinical work includes representation of clients at deportation hearings and oral arguments before the Board of Immigration Appeals and U. S. Court of Appeals. Students assist aliens with a variety of problems, including political asylum applications and adjustment of status from that of nonimmigrant to immigrant. The clinic emphasizes court exposure for the student. Ten to 20 hours of work per week, a two hour weekly seminar, and an additional weekly meeting with the supervising attorney are required. Permission of the instructor required prior to registration. Prerequisite or concurrent registration Law 360. The grade of H (Honors), P (Pass), LP (Low Pass), or NC (No Credit) is given for this course. (Fall and spring)

#### 495 Law Students in Court (4)

A clinical program in trial advocacy, offering an opportunity to develop skills as a trial lawyer while representing indigent persons in the Superior Court of the District of Columbia. Students may participate in either the civil division (which focuses primarily upon the representation of tenants in landlord-tenant actions, but also handles some consumer, negligence, and other civil matters) or the criminal division (in which student litigators defend persons charged with misdemeanor offenses). Students in both divisions have the opportunity to participate in jury trials. They are responsible for all aspects of litigation under the supervision of clinical instructors: interviewing clients and witnesses, conducting investigations, preparing pleadings, engaging in settlement negotiations or plea bargaining, and conducting all motions hearings and trials pursuant to the Superior Court's third year practice rule. Only third-year students who have completed Law 216, 217, 218, 219, and 242 may participate in the clinic. Seminars are held in the civil division on Monday evenings and in the criminal division on Wednesday evenings. Students must have one day per week available for court appearances and plan to devote approximately 20 hours per week to the clinic. Students must participate in the program for two consecutive semesters, beginning in either the summer or fall. Application must be made during the spring semester of the preceding academic year. This course may not be taken at the same time as Law 497 or any litigating activities in Law 493. Enrollment is limited, with selection by lottery. The grade CR (Credit) or NC (No Credit) is given for this course. For the bankruptcy division of Law Students in Court, see Law 463, Outside Placement. (Fall, spring, summer)



- 496 Law Students Civil Rights Research Council (LSCRRC) (2, 3, or 4)** Sirulnik and Staff  
Clinical problems concerned with the legal problems of minorities, women, and the poor. Students work with organizations such as the Lawyers Committee for Civil Rights Under Law, Women's Legal Defense Fund, Civil Rights Division of the Justice Department, Institute for the Development of Indian Law, National Committee Against Discrimination in Housing, and National Senior Citizens Law Center. Approximately 60 hours of work per semester are required for each credit hour. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Permission of the instructor is required prior to registration. (Fall, spring, summer)
- 497 Civil Litigation Clinic (4)** D. Caplan, Strand  
Open to third year students. Participants represent indigent litigants in D.C. Superior Court. Students are exposed to a range of cases in the Family Division (divorce, custody, child support, alimony), and the Civil Division (landlord-tenant, small claims, negligence, consumer, property disputes). Limited opportunities also arise to work on cases in federal court and in administrative agencies. Work responsibilities include client interviewing, investigation, settlement negotiations, drafting of initial pleadings and motions, as well as conducting actual hearings and trials. Students must have 20 hours per week to devote to this clinic and must participate for both fall and spring semesters. Participation is by permission of the instructor; applications must be submitted during the spring of the preceding academic year. Prerequisite: Law 216, 217, 218, 219, and 232. Preference will be given to those students who have completed or who will be taking concurrently Law 311. Four graded credits are awarded for each semester's work in this course. (Fall, spring, summer)
- 498 Legal Activism (2 or 3)** Banzhaf  
Study of the legal process, not to benefit individual clients, but as a powerful tool for affecting social change and advancing the public interest. Topics discussed in a two-hour seminar meeting each week include principles of maximizing legal leverage, legal judo, guerrilla law, working with the press and members of Congress, drafting of legal documents, unusual legal tools and tactics, negotiation, making money from public interest law, etc. Students may choose to bring a public interest legal action before an agency or in court or may undertake another legal action project for 3 credits and receive a numerical grade. Alternatively, students may do research on a topic related to public interest law for 2 credits on a *CR/NC* basis.
- 499 Federal and Appellate Clinic (4)** D. Caplan  
Open to third year students with permission of the instructor. Students must apply during the spring semester of the preceding year. Students develop both trial level and appellate level advocacy skills while working on actual cases. Trial work is done primarily in the U.S. District Court (D.C.) and includes interviewing and counseling, investigation, preparation of pleadings and discovery, and participation in hearings and trials. Students also learn bankruptcy practice and prepare at least one bankruptcy petition. Appellate work is primarily before the D.C. Court of Appeals and includes review of the trial transcript, preparation of briefs, and oral argument. Students must devote approximately 20 hours per week to this course. A weekly seminar includes reading assignments, role playing and other simulations, and written exercises. Must be taken for 4 credits per semester for the full academic year. Prerequisite: Law 216, 217, 218, and 232. (Fall and spring)
- 501 Public Economic Policy and the Law (2)** D. Peterson  
Interrelation of law and economics in such subject-matter categories and decisional contexts as economic regulation of industry, fiscal policy planning, government research and development practices, foreign trade and investment, and public spending priorities. (Research paper). (Spring—evening)
- 502 Law and Economics (2)**  
Theoretical applications of economic analysis in the study of legal problems and legal institutions. Social welfare theory and basic microeconomic theory are used to explore the common law. For students with no previous economic training. (Examination)

**504 Public International Law Seminar (2)**

Group study of contemporary problems in the theory and practice of international law. Limited enrollment. Prerequisite: Law 444 or permission of instructor (Research paper or examination)

**505 International and U.S. Regulation of Foreign Trade (2)**

C. Johnston

Study of domestic and international laws and institutions governing foreign trade. Included are the legal consequences of U.S. participation in the GATT, UNCTAD, and other international forums, laws regulating customs and tariffs, government procurement, subsidies, dumping, unfair foreign trade practices, disruptive imports under the escape clause, East-West trade, the generalized system of preferences, most favored nation treatment, exports under the Export Administration Act, and foreign assets control, the impact of Friendship, Commerce, and Navigation treaties. Specialized problems in regulating boycotts, foreign corrupt practices, and restrictive business practices. Prerequisite or concurrent registration: Law 440, permission of instructor may be substituted. (Examination) (Spring—evening)

**506 International Business Transactions Seminar (2)**

Group study of contemporary problems in international business law and practice. Limited enrollment. Prerequisite: Law 446 or permission of instructor (Research paper or examination)

**507 Regulation of Investment Advisers and Investment Companies (2)**

Applicability of the Investment Company Act of 1940 to particular business activities that may bring an entity within the statutory definition of investment company; litigation as to fees; policy considerations relating to front end loads; SEC regulations regarding advertising and promotion; restrictions on activities by affiliates; and current SEC disclosure requirements. Applicability of the Investment Advisers Act of 1940 to activities of individuals and entities; procedures for compliance; First Amendment issues raised by SEC enforcement actions; and civil liability under the antifraud provisions of the securities laws. (Examination)

Budetti

**508 Health Care Delivery Systems Seminar (2)**

Study of the role of the lawyer in existing and proposed national systems for delivering health care. Students will gain familiarity with the concepts and terms in health care delivery by working with issues in the design, finance, and administration of existing arrangements; examination of the means of reconciling the expectations of various groups of health care service consumers and providers. (Examination or research paper) (Fall—day, spring—evening)

A. Levine, Safir

**509 Food and Drug Law (2)**

Consideration of the standards of federal law applicable to the compositional and representational elements of foods, drugs, medical devices, and cosmetics. Provisions of the Federal Food, Drug, and Cosmetic Act, their development, application, and judicial and administrative interpretation. (Research paper or examination) (Spring—evening)

Starrs, Melson

**532 The Crime Lab, the Forensic Scientist, and the Criminal Lawyer (2)**

Designed to acquaint the student with the operations of a modern crime laboratory and the courtroom acceptability of testimony of forensic scientists and other evidence on laboratory test results. Identification of individuals (fingerprints, palmprints, footprints, voiceprints, anthropological reconstruction, hair identification, and serology), identification of objects (ballistics, handwriting, typewriting, fiber identification, paints, varnishes, glass, wood, and paper), toxicology, pathology, forensic use of the microscope and the camera, the coroner and the medical examiner systems, and drug law enforcement. Visual aids, crime laboratory guest lecturers, and field trips to crime laboratories. (Research paper or examination at the discretion of the instructor) (Fall—evening, spring—day)

**534 Criminal Practice Seminar (2)**

Tactical and practical applications of criminal law, mastery of techniques in trying criminal cases. Class sessions built around mock problems based on actual criminal cases. student role-playing as defense attorneys and prosecutors. All phases of criminal trial work are covered—client relations, investigation, discovery, trial preparation, particular emphasis on courtroom techniques—direct and cross-examination, impeachment, refreshing recollection, laying foundations for exhibits, argument, and courtroom demeanor. Though many of the mock prob-



lems are written from a defense viewpoint, techniques taught are relevant to both prosecution and defense. Enrollment limited to 15 third-year and graduate students. Prerequisite: Law 305. Students may elect to receive either a numerical grade or the grade *CR* (Credit) or *NC* (No Credit).

- 538 **Law of Real Estate Financing (2)** Carroll, Stuart  
Types of lenders, choice of entity, construction loans, permanent financing, lenders' obligations, remedies, and liabilities, title insurance, survey, and liens, ground lease and commercial lease/leasehold mortgage, joint ventures, alternate capital formation; opinion letters. (Examination) (Spring—evening)
- 539 **Survey of Mortgage Finance (2)** Fruscello  
The primary and secondary mortgage markets, terms and conditions of residential mortgages, mortgage backed securities, derivative securities, originating, selling, and servicing a mortgage; market regulation and regulators, structure and function of Fannie Mae, Freddie Mac, Ginnie Mae, FHA, S&Ls, banks, and mortgage bankers. (Examination) (Fall—evening)
- 543 **Water Resources Law (2)** Wood, Muys  
Federal and state powers over water, riparian and prior appropriation doctrines, Federal permit programs and wetland protection, Environmental problems concerning water quantity. Recommended as an introductory course. (Examination) (Spring—evening)
- 544 **Environmental Planning (2)** Kussy  
Impact of environmental laws on government decision making, including administrative law issues, comprehensive transportation planning, the National Environmental Policy Act, historic preservation, parkland protection, the Coastal Zone Management Act, wetland protection, farmland protection, the Endangered Species Act and other wildlife issues, mitigation of environmental impacts, role of governmental policies relating to the environment, legislative issues, and state environmental laws. (Examination) (Fall—evening)
- 545 **Regulation of Chemicals (FIFRA & TSCA) (2)** T. Johnston, Fleuchaus  
Examination of environmental pesticide control, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Toxic Substances Control Act (TSCA), and related legislation. (Examination) (Fall—evening)
- 546 **Natural Resources Law (2)** Sheldon  
Introduction to federal public lands and their multiple uses: forestry, grazing, water, mining, fish and wildlife, recreation, and preservation. Principles of congressional and state authority over these lands. Endangered Species Act and wildlife refuges. The Wilderness Act and the National Park System. Class focus on topical case studies and statutory materials. Recommended as an introductory course. (Examination) (Fall—evening)
- 547 **Water Pollution Control (2)** Grumbles  
Introduction to water pollution control and the Clean Water Act. (Examination) (Fall—evening)
- 548 **Control of Toxic and Hazardous Substances (RCRA & CERCLA) (2)** Friedman, Gutter  
Analysis of the federal and state laws and regulatory schemes relating to the control of toxic and hazardous substances. The Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund") are examined. (Research paper) (Spring—evening)
- 549 **Energy Law (2)** Hollis, Benkin  
Survey of federal regulation of the major energy industries. Emphasis on federal controls affecting the natural gas, coal, oil, synthetic fuel, and electric industries. The course approaches energy regulation from a statutory and case standpoint, and also deals with practical, procedural issues. Enrollment is limited to 35 students. Recommended for third-year students. (Examination) (Fall—evening)
- 550 **Use and Control of Nuclear Energy (2)** Malsch  
Analysis of the legal framework for regulation of nuclear energy in the United States and for dealing with proliferation of nuclear weapons abroad. Discussion of substantive technical and policy issues relating to nuclear power reactor safety, disposal of radioactive waste, and safeguarding nuclear installations against domestic nuclear terrorism. Focus of the legal discussion is on the U.S. Nuclear Regulatory Commission. Includes such topics as federal preemption, impact of

- the National Environmental Policy Act of 1969, conduct of adjudicatory hearings under the Administrative Procedure Act, compensation for injuries from nuclear accidents, and preclearing antitrust reviews. (Research paper) (Fall—evening)
- 551 International and Comparative Environmental Law (2)** Campbell  
 Environmental law of the United States, foreign and domestic environmental law of Japan, and international environmental law of the European community. The course considers differences in implementation and enforcement of domestic environmental law under the federal system of government in the United States and the central system of government in Japan as well as differences in implementation and enforcement of domestic and international environmental law. In comparing domestic and international environmental laws, toxic substance and pesticide legislation in the United States, Japan, and the European community is covered. (Research paper) (Spring—evening)
- 552 Licensing of Intellectual Property Rights (2)**  
 The legal context of licensing situations: rights and duties of parties to licenses; appropriate terms and conditions in contracts; antitrust and misuse constraints; and selected topics under the law of international licensing. Prerequisite: Law 464 or permission of instructor. (Examination)
- 553 Chemical and Biotech Patent Practice (2)** Wegner  
 Seminar on patent application preparation, prosecution, appeals, and interferences peculiar to chemical and biotech patent practice. Intended for students who plan to specialize in patent practice. Prerequisite: Law 464 and 466 or permission of instructor. Open to graduate law students; J.D. students may enroll with permission of the dean. (Examination)
- 554 Patent Law Seminar (2)** Banner  
 In depth study of modern Supreme Court cases and those of the Court of Appeals for the Federal Circuit relating to patent validity fundamentals, the scope and construction of patents, their infringement and relief, and the defenses available in the patent law. Prerequisite: Law 464 and 466 or permission of instructor. Open to graduate law students; J.D. students may enroll with permission of the dean. (Examination) (Spring—evening)
- 555 Interference Law and Practice (2)** Klitzman  
 A study of the substantive and procedural law relating to the determination of priority of invention in patent cases. This course is intended for students planning to specialize in patent practice. Prerequisite: Law 464 and 466, or permission of instructor. Open to graduate law students; J.D. students may enroll with permission of the dean. (Examination)
- 556 Enforcement of Patent Rights (2)**  
 This course is designed for those who plan to specialize in patent litigation and includes a study of jurisdiction, venue, injunctive relief, damages, attorneys' fees, and defenses in patent litigation. Prerequisite: Law 464 and 466, or permission of instructor. Open to graduate law students; J.D. students may enroll with permission of the dean. (Examination)
- 557 Electronics and Computers, Patent Practice (2)** Newman  
 The practice in patent matters relating to electronics and computer subjects, including software, with special attention to the preparation, prosecution, appeals, and interferences that are peculiar to this area of patent practice, as well as related copyright aspects. The course is intended for those who plan to practice in the patent field. Prerequisite: Law 464 and 466, or permission of instructor. Open to graduate law students; J.D. students may enroll with permission of the dean. (Examination)
- 558 Foreign and Comparative Patent Law (2)** Wegner  
 A study of the patent law of other countries and an analysis of the differences, both substantive and procedural, between those laws and the laws of the United States. Special emphasis on the current negotiations concerning harmonization of patent laws throughout the world. Prerequisite: Law 464 or permission of instructor. (Research paper) (Spring, even years—evening)
- 559 Copyright Law (3)** Schechter, Moore  
 Historical background and general survey: how copyright is secured and maintained, subject matter of copyright, scope of protection, duration, renewal, and termination of transfers; jurisdiction and remedies; contracts and combinations, including compulsory licenses and performing rights societies; other doctrines



neighboring on copyright, international aspects of copyright, including the Berne convention and other treaties on copyright and related subjects. (Examination) (Fall—evening; spring—day)

**560 Trademark Law (2)**

Price

Procedural and substantive law on use, registration, and protection of trademarks, including the registration procedure in the U.S. and foreign offices. The law of domestic and foreign licensing and franchising arrangements relating to trademarks. Credit may not be earned for both Law 450 and 560 (Examination) (Fall, odd years—evening)

**561 Law of the European Communities (2)**

Winter, Lehner

Study of the European Communities' law-making structure and substantive doctrines of EC law (e.g., antitrust, insider trading, director liability, unionization, workers' rights, and transborder data flow) (Short paper and examination) (Spring—evening)

**562 Law of Japan (2)**

An introduction to the constitutional structure of Japan, including political institutions and the judicial system, the legal profession, criminal law, domestic relations, business organizations, commercial law, administrative regulation, taxation, dispute resolution, intellectual property, restrictive business practices, and trade. (Research paper or examination)

**565 International Law of Human Rights (3)**

Buergenthal

Development of the rights of man from Grotius through the American and French Revolutions to the work of the United Nations in the field of human rights, the individual vis à vis the state, the regional approach to international protection of human rights, with emphasis on the European Convention, the inter-American, African, and Socialist approaches, human rights in armed conflict and terrorism as a basic deprivation of human rights. Prerequisite or concurrent registration Law 444; for Post-J.D. students, permission of instructor may be substituted (Examination) (Fall—day)

**566 International Law of Air and Space (2)**

M. Smith

Study of the development of international law related to the use of air space and outer space, analysis of air and space treaties in force, the role of various intergovernmental and nongovernmental international organizations, consideration of special problems such as liability resulting from space activities, space technology and arms control, and pollution and contamination of outer space, earth resources, sensing, etc. Enrollment limited to 25 students. Prerequisite or concurrent registration: Law 444; for Post-J.D. students, permission of instructor may be substituted. (Research paper) (Fall—evening)

**567 International Law of the Sea (2)**

Sohn

International law related to the use of ocean space. Development of international law concerning internal waters, territorial sea, contiguous zone, high seas, continental shelf, fisheries, exclusive economic zone, maritime boundaries, marine environment, marine scientific research, deep seabed, and settlement of disputes. Current legal and policy issues associated with these areas. Prerequisite or concurrent registration: Law 444; for Post-J.D. students, permission of instructor may be substituted. (J.D. students—examination; post-J.D. students—examination or research paper) (Fall—day)

**568 International Humanitarian Law (2)**

Parks

Human rights law in international and internal armed conflict, examining the origins of the law of war, the 1949 Geneva Conventions for the Protection of War Victims, the Geneva Protocols of 1977, the 1980 Geneva Conventional Weapons Convention, other treaties and customary international law relating to means and methods of warfare, the role of the International Committee of the Red Cross, war crimes and enforcement mechanisms, and current problems in the regulation of hostilities. (Research paper) (Spring—day)

**569 Soviet Law (2)**

The concepts of socialist legality and socialist democracy and the political (class) bias of the Soviet legal system, the basic lack of institutional integrity, the ideological heritage (Marxism-Leninism) and "living Marxism," the Soviet theory of state and law, socialist federalism, the state as principal economic actor, the role of the Communist Party in the Soviet party-state, and governmental and party institutions, the legal relationship between the individual and the state, collectivism vs. individualism and individual rights and obligations, the Soviet

approach to international law; the Gorbachev revolution; *perestroika* and *glasnost* and the destabilization of the Soviet system; substantive legal areas: criminal law, property law, labor law, law of civil legal obligations, family law, land law, and collective farm law, and criminal and civil procedural codes. (Research paper or examination)

**570 Chinese Law (2)**

Emphasis on the legal system of China; analysis of the constitutional law of China, including general principles, state structure, and rights and duties of citizens, a brief survey of the administration of justice—courts, procuratorates, and lawyers, marriage law, land law, counter revolutionary act and other criminal statutes, principles of civil law, Chinese concept of international law. (Research paper)

**571 International Negotiations (2)**

The art and science of international negotiations from a practitioner's perspective: analysis of the roles of the legislative and executive branches; examination of the inter- and intra-agency processes, including pre-, during, and post-negotiation; impact of external influences, Panama Canal Treaties, Law of the Sea Treaty, arms control negotiations, with a case study of the Philippines Base Negotiations. Practical exercises in negotiations. Prerequisite or concurrent registration Law 444 or 446 for graduate law students, permission of instructor may be substituted. (Research paper)

**572 Telecommunications Law (2)**

Federal regulation of the broadcasting, cable, and telephone industries. Topics include the licensing process; content regulation and political broadcasting rules; structural regulation of the broadcasting industry; cable franchising; rules governing the relationship between the cable and broadcasting industries; FCC and judicial responses to the growth of competition in the telephone industry, and the divestiture of AT&T. (Examination) (Spring—evening) Symons

**573 Taxation—Timing of Income and Deductions (2)**

Problems involved in assigning items of income and deduction to the proper taxable year. General implications of timing differences, annual accounting periods, methods of accounting (particularly the cash method and the accrual method), constructive receipt and the cash equivalency doctrine, transactional problems (including the tax benefit rule and claim of right doctrine), the installment method of reporting gain, cost recovery (including depreciation), and changes in accounting periods and methods. Net operating losses and inventory accounting may also be considered. While this course entails some coverage of widely used accounting methods, it is directed principally at accounting aspects of federal taxation. Students interested primarily in securing a familiarity with financial accounting precepts should instead take Law 324, *Law and Accounting*. Prerequisite: Law 420 or its equivalent. (Examination) Effros

**575 International Banking (2)**

Study of the international monetary system, including the IMF and allied institutions and both international loan transactions and the regulation of international financing organizations. Issues arising out of exchange risk and claims valued in foreign currency, counseling approaches to such risks, the Eurodollar market, and the structure and terms of international loans and banking institutions. Comparisons of different national approaches to bank regulation, cooperation of regulators in supervising international banking activity, and the effect of such activity on the U.S. banking system and debtor nations. Prerequisite: Law 446 or permission of the instructor. (Examination or research paper) (Spring—day)

**577 Special Corporate Taxation Problems (2)**

Issues related to restructurings, acquisitions (taxable and tax free), liquidations, contributions to capital, consolidated returns (timing, deferred intercompany transactions, and losses), allocation of income and deductions among related taxpayers, net operating losses, and classification of instruments as debt or equity. Other issues will be considered, based on the current state and application of the federal income tax laws. Such issues have included the rules regarding the value of money, Sub-chapter S corporations, and controlled foreign corporations. Prerequisite: Law 424. (Research paper or examination) Hopkins

**578 Nonprofit Organizations: Law and Taxation (2)**

Tax-exempt organizations, policy and practice of preferred tax treatment for selected organizations and gifts to them. Statutes, regulations, and IRS practice. Hopkins



legislative origins, judicial interpretations, and policy considerations. Tests of qualification, disqualification, and limited tax preference. Mechanics of securing and retaining exemption: qualified exemption, unrelated business income, private inurement, political activity. Denial or loss of exemption. Return and reporting requirements. Comparative tax treatment of nonexempt and nonprofit organizations. Special sanctions with respect to private foundations, managers, and donors for improper, excessive, or prohibited activities. Enrollment may be limited. Prerequisite: Law 420 (Research paper or examination) (Fall—evening)

**579 Real Estate and Income Taxation (2)**

Tucker, Gottlieb

The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests; various entities for the ownership and development of real estate; the impact of taxes on the landlord and tenant, the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as sale-leaseback; depreciation, amortization, and obsolescence basis and basis adjustments; and casualties and other involuntary conversions. Prerequisite: Law 420. Law 424 is suggested but not required (Examination) (Spring, odd years—evening)

**580 Natural Resources Taxation (2)**

Peroni

Application of federal income tax law to producing segment of oil and gas industry. Classification of interests; treatment of exploration and development expenditures. Depletion allowance and concept of economic interests. Sales vs. leasing transactions. Organization problems. Prerequisite: Law 420. (Examination)

**581 State and Local Taxation (2)**

Taxation by state and local governments, problems of real and personal property taxation, sales and use taxes, business and personal income taxes. Limitations on taxation of interstate commerce. Congressional problems (Research paper or examination)

**583 Federal Income Taxation of Foreign Business and Investment (2)**

H. Levine

The provisions and policies of federal income tax law applicable to foreign income, including considerations affecting the choice of methods of engaging in foreign business and investment, treatment of controlled foreign corporations, allocation of income in foreign commerce, credit for foreign taxes, principles and trends of U. S. tax treaties. Prerequisite: Law 420 (Examination) (Fall—evening)

**584 Federal Income Taxation of Property Transactions (2)**

An in-depth study of the federal income tax consequences relating to the sale, exchange, or other disposition of property, including stock and securities, real estate, machinery and equipment, commodities, foreign currency, patents and copyrights, contracts, goodwill and going-concern value, franchises, and other tangible and intangible property. The continued significance of the distinction between and effect of capital and ordinary gain or loss. Related areas are also examined, including the alternative minimum tax, disallowance of losses, depreciation recapture and methods of deferring recognition of gain and loss. Prerequisite: Law 420 (Examination)

**585 Federal Income Taxation of Trusts, Estates, and Beneficiaries (2)**

Rules that allocate items of income and deduction between a trust or estate and its beneficiaries. Computation of distributable net income, the distribution deduction, allocation of deductions between trust and beneficiaries, allocation of expenses to particular classes of income, tier system, treatment of specific bequests, and treatment of capital gains. The treatment of certain trusts as owned by the grantor or beneficiary and the special rules taxing certain gains of a trust at the grantor's rate: rules that determine whether a trust will be taxed under the general scheme for taxing trusts or whether it will be treated as owned by the grantor. (Examination)

**586 Deferred Compensation I (2)**

Minimum tax and labor law standards of the Employee Retirement Income Security Act of 1974 (ERISA), the Retirement Equity Act of 1984 (REA), and the Pension Protection Act of 1987 applicable to pension plans. Standards include age and service requirements for plan eligibility, vesting, benefit accruals, survivor benefits, coverage of employee group, nondiscrimination (including cash or

- deferred plans (§401(k)), integration with social security benefits), and limits on contributions and benefits. Current developments affecting plans. (Examination)
- 587 Deferred Compensation II (2)**  
Rules of ERISA and the Internal Revenue Code of 1986 affecting nonqualified plans of deferred compensation: constructive receipt, cash equivalent, economic benefit, economic performance, substantial risk of forfeiture (IRC §§83, 162, 401 [h], 402 [b], and 404 [a][5]). Qualified plans: funding, deductions, distributions, qualified domestic relations orders, fiduciary standards, self-dealing, conflict of interest. (Examination)
- 588 Tax Practice and Procedure Seminar (2)**  
An examination of the procedural aspects of federal tax practice, including both tax controversies and tax planning. Tax controversy topics include audit procedures, IRS administrative appeals, litigation, settlement, claims for refund and collection, and criminal tax matters. Tax planning topics include the legislative process, regulations, ruling requests, technical advice, opinion letters, penalties, and ethical problems. The course emphasizes practical information that is essential in day-to-day tax practice, both in private law firms and in the government. Prerequisite: 5 semester hours of taxation courses, including Law 420. (Examination and writing assignment)
- 591 Legislative Drafting (2)** P Smith, Bergman, Goodloe  
Advanced instruction and practice in legislative drafting, overview of legislative process with emphasis on legislative drafting. Enrollment limited to 30 students. (Problem assignments) (Fall and spring—evening)
- 596 Graduate Clinical Studies (1, 2, 3, or 4)** Staff  
Limited to LL.M. candidates. Practical experience in the student's area of specialization or interest. The student may work with a government agency, congressional committee, court, or other such entity performing tasks normally assigned to an attorney. Course approval must be obtained from the student's faculty adviser and/or the dean. Students enrolled in either the Environmental Law or Government Contracts program should refer to Law 414 and Law 597. A maximum of 4 credit hours may be applied toward graduation. Five hours of work per week are required for each credit. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall, spring, summer)
- 597 Clinical Studies in Government Contracts Law (2, 3, or 4)** Cibinic, Nash  
Students work on a project in the government contracts field under the supervision of the faculty directors of the program and a lawyer practicing government contract law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public interest organization. Admission to the course requires approval of one of the faculty directors of the program. The grade CR (Credit) or NC (No Credit) is given for this course. Five hours of work per week are required for each credit. (Fall and spring—day)
- 598 Graduate Independent Legal Writing (1 or 2)** Staff  
Limited to graduate students with at least a B average who have had a seminar or comparable course in the field of proposed research. Students are responsible for obtaining an adviser from the full-time faculty who is willing to sponsor their research. This adviser's name must be submitted to the Dean at registration. Work must be completed within the semester. Students may repeat this course once for credit with the approval of the Dean. (Research paper) (Fall, spring, summer)
- 599-600 Thesis (2-2)**  
Students must register for two successive semesters and cannot register for both sections in one semester. (Fall, spring, summer)
- 622 Introduction to American Law (3)** Buergenthal  
Required for graduate students holding a foreign law degree only, this course focuses on the fundamental doctrinal and methodological characteristics of the American legal system. The approach will be comparative in nature and will deal with selected topics drawn, *inter alia*, from constitutional law, the law of torts, contracts, civil procedure, and conflicts of law. American legal education, the judicial system, and the legal profession are also discussed. (Examination) (Fall—day)



## The University

### History and Organization

The George Washington University had its beginning in 1821 as the Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character, it provided "that persons of every religious denomination shall be capable of being elected Trustees, nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area contains several reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate), the Graduate School of Arts and Sciences, the professional schools, which include the National Law Center, the Elliott School of International Affairs, and the Schools of Medicine and Health Sciences, Engineering and Applied Science, Education and Human Development, and Business and Public Management, and the Division of Continuing Education.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an *ex officio* member.

### Academic Status

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools. The University is on the approved list of the American Association of University Women and is a member of the College Board.

### Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

A new campus in Northern Virginia for graduate studies, research projects, and professional development programs is planned to begin operations in fall 1991. The campus is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

### The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member.

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### General Alumni Association

The objectives of this association are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have enrolled in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University.

The affairs of the Association are directed by a Governing Board, the majority of whose members represent the constituent alumni organizations of the University's schools and college. The voluntary leadership of the Association works closely with the staff of the Alumni Relations Office in carrying out Association affairs. The Association may be contacted through the Alumni Relations Office.

### The George Washington Law Alumni Association

The George Washington Law Alumni Association was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the school in close touch with each other, and to further the interests of the school. Eligible members are those who have matriculated at the school or National University and have left in good standing, and any member or former member of the faculty of the school. Active members are those eligible members who are current contributors to the Law Annual Support Program of the University and life members of the George Washington Law Alumni Association. The Association periodically publishes the Law Alumni Directory.

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BA. 1966, University of Notre Dame; M.D. 1970, Columbia University; LL.D. 1977, University of California, Berkeley

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†On leave of absence spring semester 1992.

‡On sabbatical leave academic year 1991-1992.



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## Index

- Academic dishonesty, 34
- Academic work load:
  - J.D., 9; LL.M., 19
- Accident insurance, 33
- Accreditation, University, 68
- Admission:
  - J.D., 7; LL.M., 15; S.J.D., 19
- Advanced standing, J.D. degree, 7
- Alumni associations, 70
- Attendance, 12, 21
- Board of trustees, 68
- Calendar, academic, 4
- Career development and placement services, 32
- Changes in program of study:
  - J.D., 12; LL.M., 20
- Consortium, 21
- Continuing legal education, 32
- Continuous enrollment:
  - J.D., 13; LL.M., 21
- Course descriptions, 41
- Course offerings, time of, 29, 41
- Courses of instruction, 37
- Credit for courses in other departments:
  - J.D., 13; LL.M., 20
- Credit/no credit option, 11
- Curriculum, J.D., 8, 37; LL.M., 16
- Degree requirements:
  - J.D., 8; LL.M., 15; S.J.D., 22
- Disabled student services, 34
- Dismissal of students, 35
- Doctor of Juridical Science degree, 21
- Drugs, University policy on, 36
- Employment, student, 9
- Enrichment program, 30
- Entrance requirements:
  - J.D., 7; LL.M., 14; S.J.D., 21
- Environmental law, LL.M. program in, 16
- Equal opportunity, University policy on, 34
- Examinations, 11, 20
- Exclusion and probation, 12
- Facilities, 31
- Faculty, 72
- Fees and financial regulations, 23
- Fellowships, graduate, 27
- Financial aid, 26
- George Washington Law Review*, 30
- Government contracts, LL.M. program in, 16
- Grades:
  - J.D., 10; graduate programs, 19
- Graduation requirements, 29
- Health service, student, 33
- Honors:
  - J.D., 10; LL.M., 20
- Housing, 32
- Insurance, health and accident, 33
- Intellectual property law, LL.M. program in, 17
- International and comparative law, LL.M. program in, 17
- Jacob Burns Law Library, 31
- Joint Juris Doctor-Master's degree programs, 14
- Joint LL.M./M.P.H. program, 19
- Journal of International Law and Economics*, 30
- Juris Doctor degree, 7
- Land use management and control, LL.M. program in, 18
- Law School Admission Test, 7
- Law School Data Assembly Service, 7
- Loan funds, 26
- Marvin Center, 33
- Master of Laws degree, 14
- Moot court competitions, 30
- Officers of administration, 70
- Order of the Coif, 10
- Prizes, 28
- Probation, 12
- Problem assignments, 41
- Programs, right to change, 35
- Publications, 30
- Readmission:
  - J.D., 13; LL.M., 21
- Refunds, 24
- Registration, 29
- Regulations, academic:
  - J.D., 9; graduate programs, 19
- Regulations, financial, 23
- Regulations, University, 34
- Release of student information, 34
- Research papers, 11, 20
- Residence requirements:
  - J.D., 8; LL.M., 15; S.J.D., 22
- Rules, right to change, 35
- Scholarship funds, 26
- Services, student, 31
- Student conduct, 35
- Student employment, 9
- Student health service, 33
- Student organizations, Law Center, 31
- Summer school credit from other law schools, 13
- Summer session, 29
- Take-home examinations, 41
- Test of English as a Foreign Language, 15
- Thesis requirement, master's, 18
- Thesis waiver, 19
- Transcripts of record, 30
- Transfer students, 7
- Tuition, 23
- Veterans benefits, 27
- Visiting (unclassified) students, 8
- Withdrawals, 24
- Writing assignments, 41



## Degrees Offered by The George Washington University

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*Graduate School of Arts and Sciences:* Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Music (M.Mus.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

*School of Medicine and Health Sciences:* Associate in Science (A.S.), Bachelor of Science (B.S.), Bachelor of Science in Health Science (B.S. in H.Sc.), Master of Public Health (M.P.H.), and Doctor of Medicine (M.D.)

*National Law Center:* Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

*School of Engineering and Applied Science:* Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

*School of Education and Human Development:* Bachelor of Arts in Education and Human Development (B.A. in Ed.&H.D.), Bachelor of Science in Human Kinetics and Leisure Studies (B.S. in H.K.L.S.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

*School of Business and Public Management:* Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Master of Urban and Regional Planning (M.U.&R.P.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.)

*Elliott School of International Affairs:* Bachelor of Arts (B.A.) and Master of Arts (M.A.)

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